IN THIS ISSUE—FRENCH AND GERMAN AIR PROGRESS COMPARED

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The Automobile and Automotive Industries

Vol. XXXVII New York—Thursday, October 11, 1917—Chicago No. 15

Airplane Progress In France and Germany Since 1914

Germans Have Copied Best French Machines—Teuton Aviators Fight Under Rigid Instructions—First Fighting Planes in 1915—Germans Used Many Planes at Verdun Offensive—Allies Have Fastest Machines

By W. F. Bradley

Special representative of The Automobile and Automotive Industries *on the French fronts*

IT was not until the battle of Verdun, early in 1916, that German aviation reached a full war basis with specialized machines for chasing, bombardment, observation, etc. During the battle of the Marne, September, 1914, enemy aviation was in a very imperfect condition. Nevertheless, even at that time the German machines and motors differed considerably from those employed by the French. The French had been attracted by the sporting aspect of flying and had developed a number of types of planes and motors which were more adapted for record-breaking and spectacular performances than for military operations.

It was not until 1912 that the German military authorities appear to have taken the airplane really seriously, hypnotized as they were by the dirigible balloon. From the outset the Germans sought to make aviation a branch of their army. Their only really original work was the adoption of the six-cylinder, water-cooled motor, the most successful of which were produced by Mercedes and Benz. While the Germans were not the first to use water-cooled motors on airplanes, for all the early Voisins, the Santos-Dumont planes, and the Antoinettes of 1908 and 1909 had fixed-cylinder, water-cooled engines, they were undoubtedly the first to bring out a really successful water-cooled motor, and one which, incidentally, has been largely copied by all the allies.

Automobile Racing Helped Mercedes

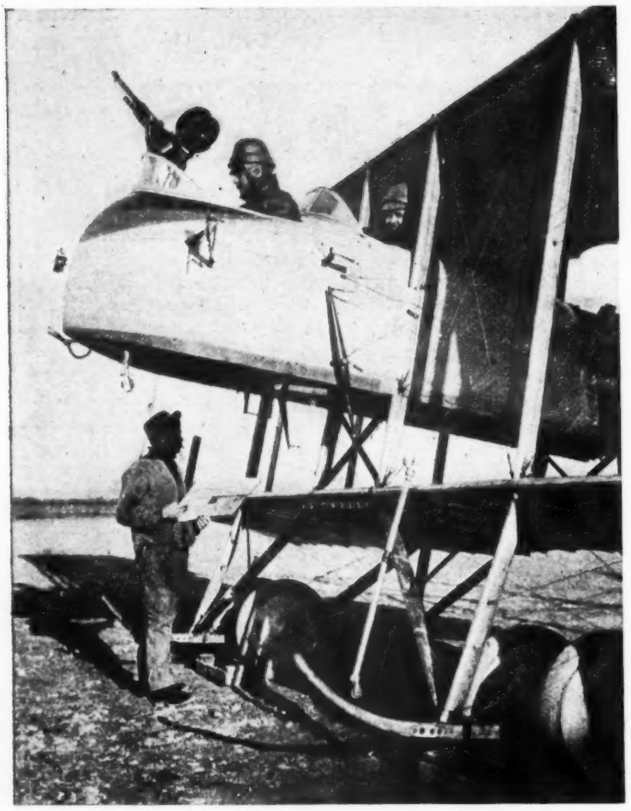
Mercedes played a very important part in the water-cooled airplane motor development, devoting all her efforts to the production of an absolutely reliable engine of moderately low weight. The automobile racing program of this firm in 1912 and 1914 was adopted more with a view to the perfection of the airplane type of engine than because of any real interest in racing itself. This is clear in the light of later events.

The best German planes at the time of the Marne were the Etrich, of Austrian origin, and the Taube, an offshoot of the former. Both had a big spread, flexible wings, and a rather pronounced V. They were neither fast nor particularly good climbers, but were remarkably stable and very good gliders. Their range of speeds was particularly good for the period. Both machines had fixed-cylinder, water-cooled engines. General construction of the planes was strong, but lacking in finish; there was not much attempt at reducing head resistance, and visibility was very poor. This defect was principally responsible for the abandonment of these types soon after the outbreak of the war. Other planes of the period were the biplanes Aviatik, Albatross, L. V. G., D. W. F., Otto (an exact copy of the Henry Farman), and the Rumpler.

Germans Not Armed at First

In 1914 German airplanes were employed for all kinds of services and were not usually armed with anything more formidable than an automatic carbine.

In 1915 the first fighting machines made their appearance. These were Aviatik and Albatross biplanes, with the motor in front and a revolving turret for the machine gunner, allowing him to fire astern and on both sides. These machines, being faster than any French planes of the period, were very for-



A now obsolete type French observation machine, with machine gun in bow

midable opponents. About this time small fast Aviatik single-seated chasers were produced.

In the fall of 1915 the German air fleet was undoubtedly superior to that of the Allies. The planes were fast and well armed; the motors, all water-cooled, and mostly six cylinders, produced by Benz, Mercedes and Opel, were rather heavy, but absolutely reliable; night flying had been well developed, electric lighting sets had been perfected, and the schemes for lighting grounds to facilitate landings were very satisfactory. While there was not much aerial tactics, the German machines could hold their own against any enemy force and were able to carry out important raids on the Allies' lines of communications.

The Germans made a prodigious use of airplanes in the Verdun battle of early 1916. A vast number of machines and all the best pilots were concentrated on this front, and at the same time the famous Fokker monoplane, armed with a machine gun firing through the propeller, made its appearance. It was also at this period that the first twin-motor airplane, armed with two machine guns, made its appearance on the Meuse sector.

No enemy machine has received so much attention as the Fokker. This plane was produced by a young Dutchman in the German service, who was satisfied to copy the French Morane-Saulnier. The only difference is in the landing gear, which is somewhat heavier and not so well finished as that of the French machine. The copy and the original have the same dimensions to a millimeter, the same horizontal speed, the same "ceiling," the same acrobatic qualities. The French Morane was always fitted with a rotary Gnome; the German Fokker had an Oberursel motor copied on the Gnome. Some of the first Fokkers captured by the French had the French Gnome motor, evidently purchased just before the war.

The Fokker was undoubtedly a very fine machine, and for a short time held its own where speed and acrobatics were of primary importance. The French opposed to it the Baby Nieuport, a biplane with rotary motor in front, and with such pilots as Nungesser, Navarre, Guyenemer, and Chaput were able to clear the skies.

During the Verdun battle the Germans were well served by the L. V. G. biplane bomb-dropping machine. While being fast, this machine was a fairly rapid climber, could attain a high altitude, was quick on controls, and carried a pilot and machine gunner and an important provision of bombs. With this machine, accompanied by Aviatiks, the Germans frequently attacked Bar-le-Duc and the munition depots around Verdun, during both day and night, and delivered fixed battles with the French planes.

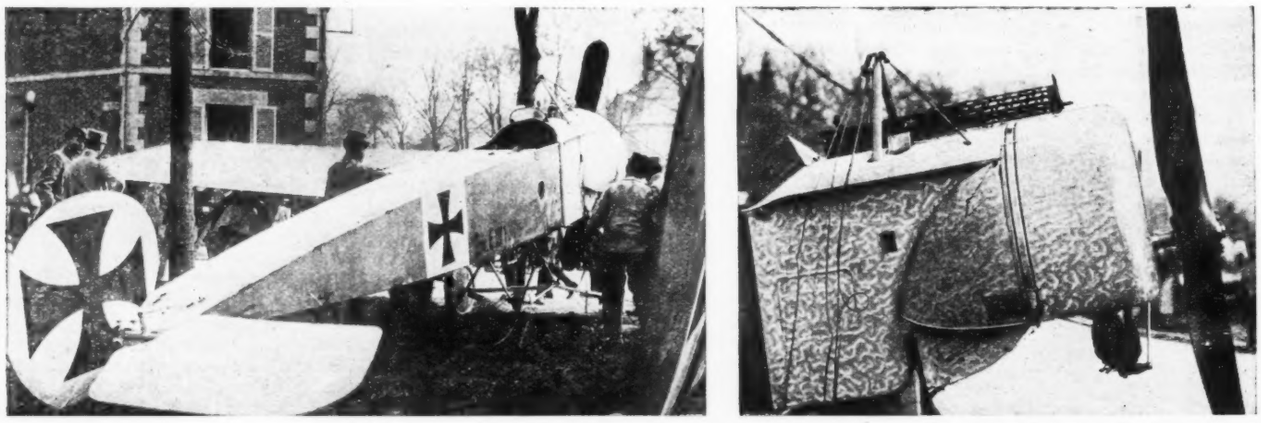
Albatross Used for Artillery Control

For artillery control and long distance reconnaissance, the enemy employed the Albatross and a very successful twin-motor machine with three fuselages. The central fuselage carried the pilot, two machine gunners, and wireless telegraphy; the two fuselages to right and left of it carried the motors and united the wings and the elevator.

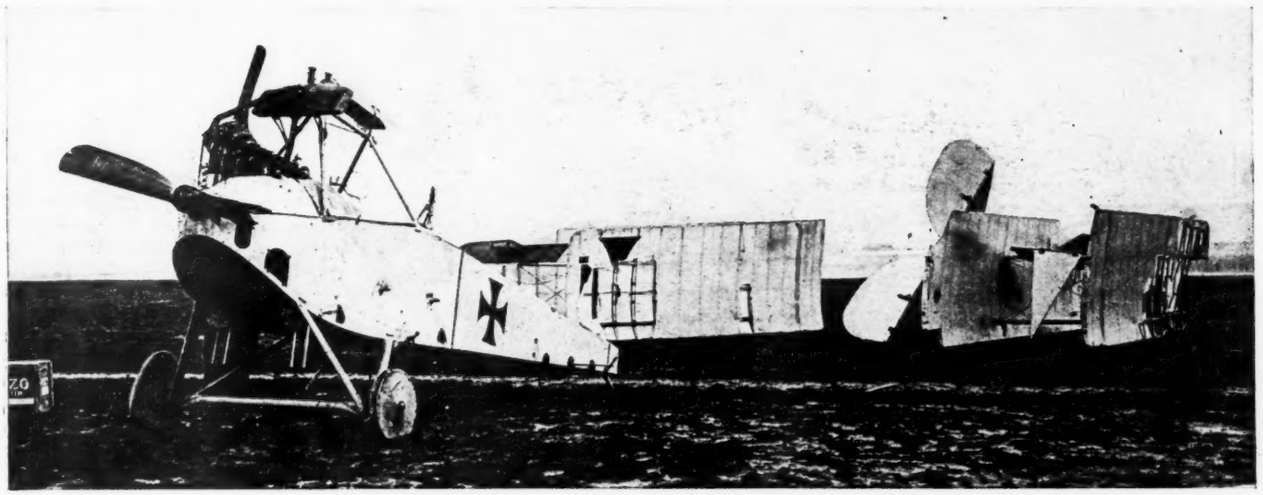
When the Somme battle opened this year the Germans had abandoned the Fokker and had produced a considerable number of small biplane chasers, and were using a big twin-motor bombardment machine, the Gotha. With the latter they bombarded London and attempted to reach Paris. The Gotha has three fuselages—a central one for the pilot and gunner, and two lateral ones for the motors, each of which is a six-cylinder 260 h.p. Mercedes driving a propeller at the rear.

At the beginning of the war the Germans abandoned the propeller at the rear (with the exception of the Otto machine), but appear to have adopted it on the Gotha with a view to better armament. The machine gunner, placed at the front of the central fuselage, is not hindered by the propellers to left and right, and can use his gun to the best advantage both in the horizontal and vertical planes. This machine carries 144 bombs and three men—machine gunner, Pilot and bomb dropper.

The fast single-seater German machines are the Albatross



Left—A German Fokker captured by the French. Right—Details of machine-gun firing through propeller on captured Fokker



A comparatively recent type Albatross. Note position of radiator

D1, Rolland, Ago, and Fokker biplane. The ceiling for practically all of them is about 23,000 ft. The slowest of these machines can touch 105 miles an hour, while the Albatross D1, on which machine the English captured Prince Frederic Charles of Prussia, has a horizontal speed of 118 miles an hour.

The tactics of the Allies and the German air forces differ considerably. While the French and the British leave a considerable amount of initiative to their pilots, the German airmen are much more rigorously controlled, and, according to military conditions, receive definite orders to stay over their own territory or to cross the enemy's lines. It is not correct, as has been stated, that the German airmen have orders never to cross the allied lines. A short time before he was killed, Oswald Boelke declared in an interview: "It is not true that our observation machines are not sent over the lines, but it is partially true as regards our chasers. There are many details of our Fokkers, for instance, which we desire to keep secret; further, it is in our interests to guard our own territory, in order to prevent the enemy taking observations of our positions. Naturally, it is the best tactic to entice the enemy over our lines, so as to make him prisoner, if alive, and to prevent his machine being repaired by the enemy."

Observers Protected by Fast Scouts

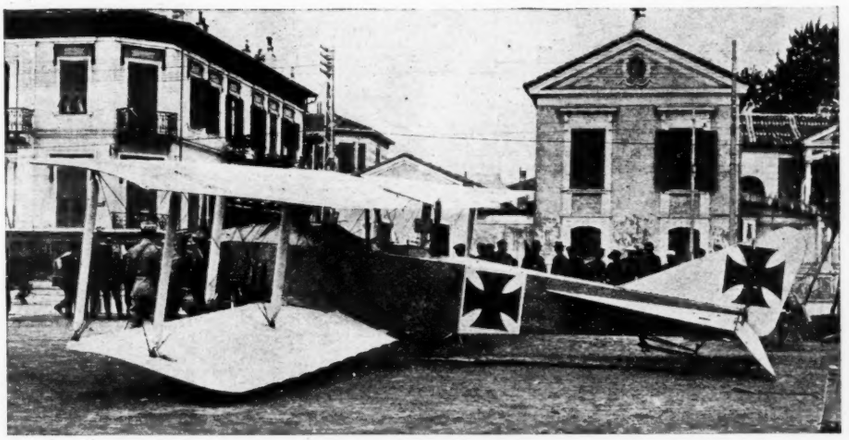
Speaking generally, the German pilots leave their own territory very much less frequently than do the Allies; when the Germans send out artillery observation machines they always protect them with fast scouts cruising in the neighborhood. Isolated observation machines very rarely accept a fight, but seek safety by diving to earth. During the Verdun battle the Germans frequently made use of a decoy machine, in the form of a comparatively slow artillery observer maintained at a height of 6500 ft.; up above, at 13,000 ft., two or three Fokkers kept watch. While the French machine was attacking the German observer, the fast Fokkers would sweep down and make the attacker the attacked. This maneuvre was so successful that the French command gave orders for no observation or photographing machine to go out without a protecting escort of chasers. The development of this principle has led to big aerial battles, with more than 30 machines taking part.

The most remarkable feature of the German pilot is his slavish obedience to instructions. Immelmann brought down most of his machines inside the German lines and never came out unless definite orders had been given. Had he been allowed greater liberty of action, it is certain that he could have accounted for a greater number of Allied airplanes. Boelke, had he not been afraid of delivering the secrets of his Fokker and of disobeying orders, might have come over the Allied lines and executed greater damage. While the spirit of discipline is admirable which will cause a man to give up a successful chase rather than disobey orders, it is evident that the results are not equal to those obtained under the French and British system of individuality. The best German pilots, Boelke, Immelmann, Wintgens, Parschau, etc., show results very much inferior to those of the leading French and British airmen.

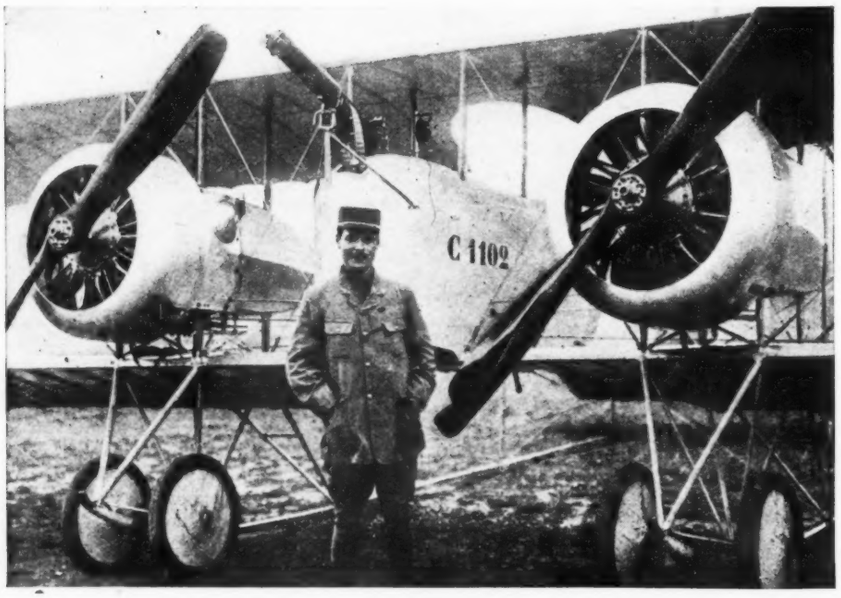
German Observation Machine Developed Rapidly

In the early stages of the war German progress was remarkably rapid in the construction of headquarters machines. Generally these machines were faster than those of the Allies; they were better fitted, had good armament, wireless telegraphy and aerial photography; the comfort of the pilot was considered, all controls were handy, the various instruments, such as compass, altimeter, revolution counters, speed indicator, were well placed and easily read; the motors were accessible and the essential organs easily dismountable, while the fuselage was streamlined with a view to higher speed. Briefly, the German observation machine developed rapidly on correct lines, while French machines did not settle down to a definite type and for a long time were handicapped by out-of-date ideas of the pre-war period.

The case of the bombardment machine is quite different. Its evolution was very slow, and for a long time the Germans made use of an observation type as a very imperfect



Captured Albatross biplane with Mercedes six-cylinder motor and machine gun on revolving turret behind pilot



A Caudron twin-motor biplane

bombardment machine. The bomb-dropping tubes were poorly placed, and the force of the motors was often insufficient for the extra load carried. It was not until the Verdun battle, early in 1916, that the German army obtained a really good bombardment machine.

Bombing Machines Developed Slowly

French progress in the bombardment type of machine was not very rapid. On the other hand, the French obtained a sudden and undisputed superiority in the chaser type of machine. During the Verdun attack the Germans brought out extra rapid Fokker and Albatross scouts, but these were very soon outdistanced by the single-seater Nieuports and the first Spad machines (the Spad is made by the transformed Deperdussin company). These two types had an undoubted superiority over enemy machines in the matter of speed, and since the end of the Verdun attack to the present day the Germans appear to have been marking time in the single-seater biplane class. These two best German machines have never touched 125 miles an hour. They easily attained 110 miles an hour, but they rarely reached a speed of 118 miles. While it is not possible to give the actual speeds of Allied machines, there is no doubt that at the present time their speed is much higher than that of the enemy, their ceiling is higher, and they have a more satisfactory speed at high altitudes.

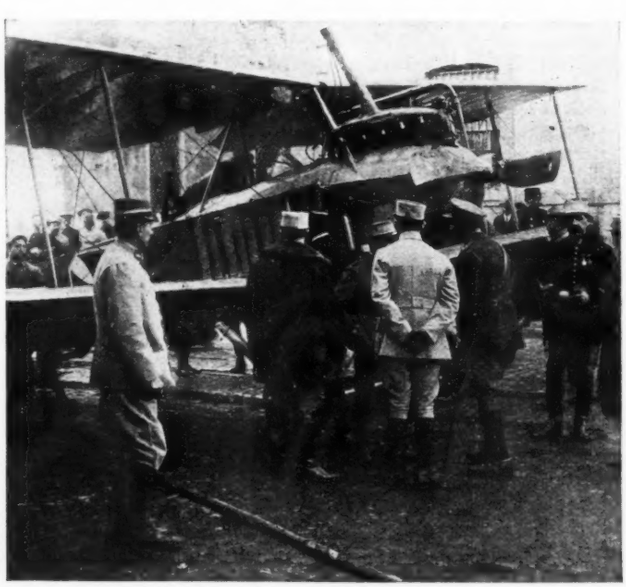
To review: The Germans concentrated their efforts on the observation machine. In the bombardment class they have created little, if exception is made of the twin-motor Gotha and the recent Friedrichsafen type.

In the chaser class the Germans have copied. The Fokker is a copy of the Morane; the Albatross D1 an attempt to copy the Spad; the Ago is based on the Nieuport.

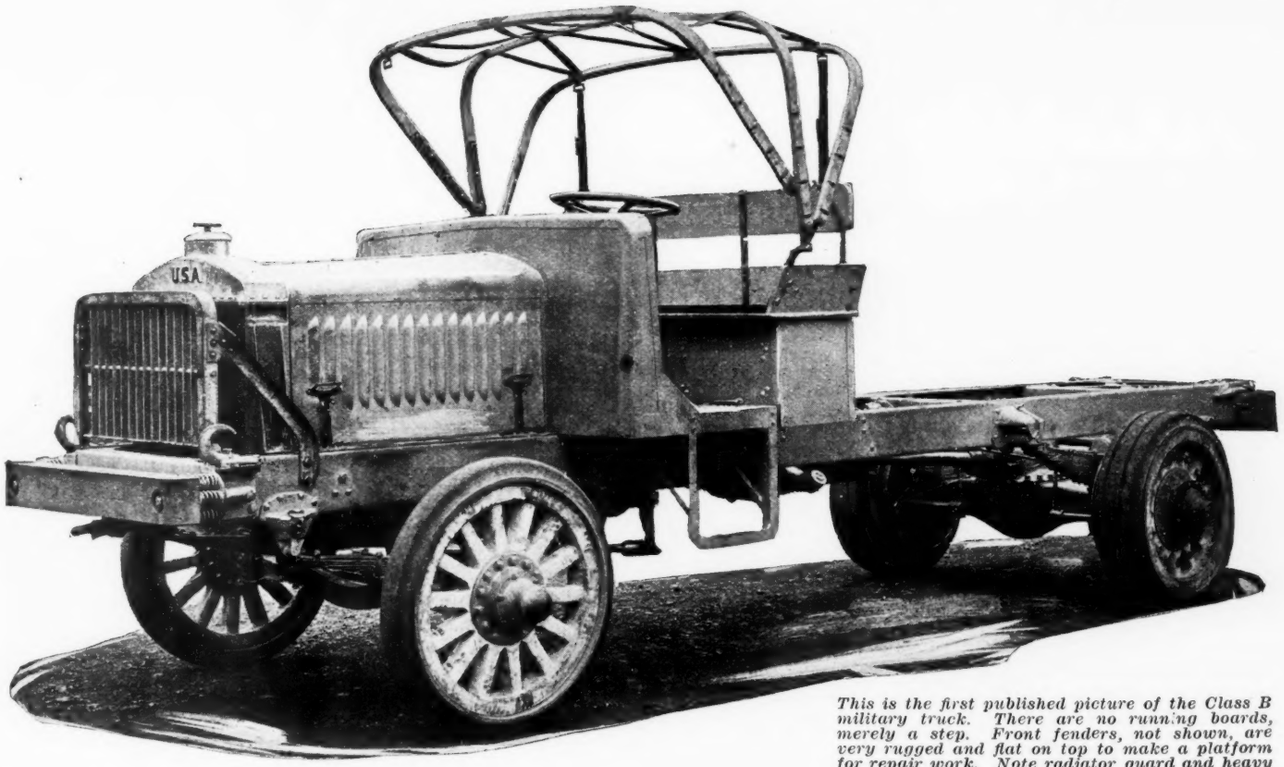
The two aviations have followed one another very closely, and if the Allies have obtained the superiority it has only been by incessant labor and very close study. Although the superiority of the Allies is doubted by some, it was admitted by the Germans in the Somme battles, for just before the advance which liberated a considerable amount of French territory the German artillery was blinded, while that of the Allies was admirably served by the air service.

The Germans have applied the same persevering methods to their aviation as to their industries and to the general preparation for war, which they had raised to the dignity of a national industry. They have also been remarkable copyists. When the first Moranes were captured they were examined with care and copied, the result being the Fokker. This lasted until the end of the Verdun battles, when the first Nieuports and Spads appeared. Some of these fell in the enemy's lines, and the Albatross D1, the Roland, the Ago, and the Fokker biplanes appeared. The first twin-motor French machines had hardly appeared on the front when the German twin-motor airplane was seen.

Although the Wright brothers made their flights with a water-cooled motor, and all the French machines used water-cooled engines prior to the appearance of the Gnome, the Germans must be given credit for being the leaders in the fixed cylinder water-cooled type. With this exception they have been good copyists.—*Adapted from L'Auto.*



Left—A captured Fokker scout machine. Right—A captured Albatross with six-cylinder Mercedes water-cooled motor



This is the first published picture of the Class B military truck. There are no running boards, merely a step. Front fenders, not shown, are very rugged and flat on top to make a platform for repair work. Note radiator guard and heavy spring bumper

First Class B Military Trucks on the Road

Two Vehicles, Built of Standardized, Composite Parts, Started on 10,000 Mile Road Test

By A. Ludlow Clayden

NEW YORK, Oct. 8.—The first two samples of Class B military trucks are on their way to Washington, one from Lima, Ohio, and another from Rochester, N. Y. They should reach the capital Saturday.

These two chassis have been built in a month or less. The engine took 19 days to manufacture from the time the first final drawing was issued to the time the motor was running. The other parts kept pace, so that assembly of the chassis started Thursday, Oct. 4, and proceeded steadily night and day.

On Monday the chassis were ready to run, lacking merely petty detail. On Wednesday they were entirely complete, had had their first test runs, were pronounced O.K. and were on their way to Washington. The actual drafting did not begin till well in August; in fact, the great bulk of the drawings were made after the end of August, many of those prepared in the first two weeks of that month being cast aside in favor of an improved design.

It is noteworthy that despite the immense speed of the drafting the number of mistakes found in building the chassis and the parts was phenomenally small. It is usual with a new design from stem to stern to discover quite a lot of things which have to be altered.

Not so with the standard truck, however; it assembled easily; it disclosed no miscalculations. The engine runs as smoothly as a good passenger car job of half the size; it has more power than was expected, the torque curve running practically flat from 600 to the governed maximum of 1050 r.p.m., with a value of 256 ft.-lb.

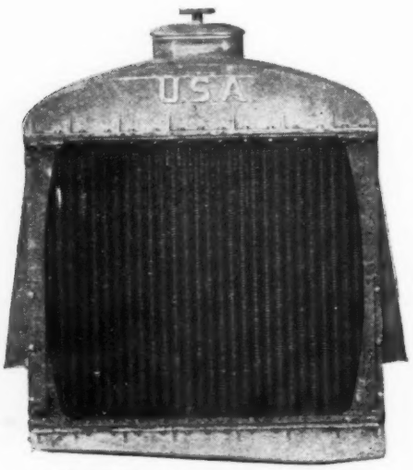
The weight of the chassis with gasoline, oil and water is 8250 lb. The total for the engine without its accessories accounts for 1050 lb., and the transmission for 185 lb. The weight is well distributed, being 3850 lb. on the front wheels and 4400 lb. on the rear.

The complete truck, with the standard military stake type body and with top for the driver's seat, weighs 10,200 lb. All these weights are with wood wheels and pressed on solid tires, the demountable pattern having been abandoned by the War Department, partly on account of the considerable increase in the weight.

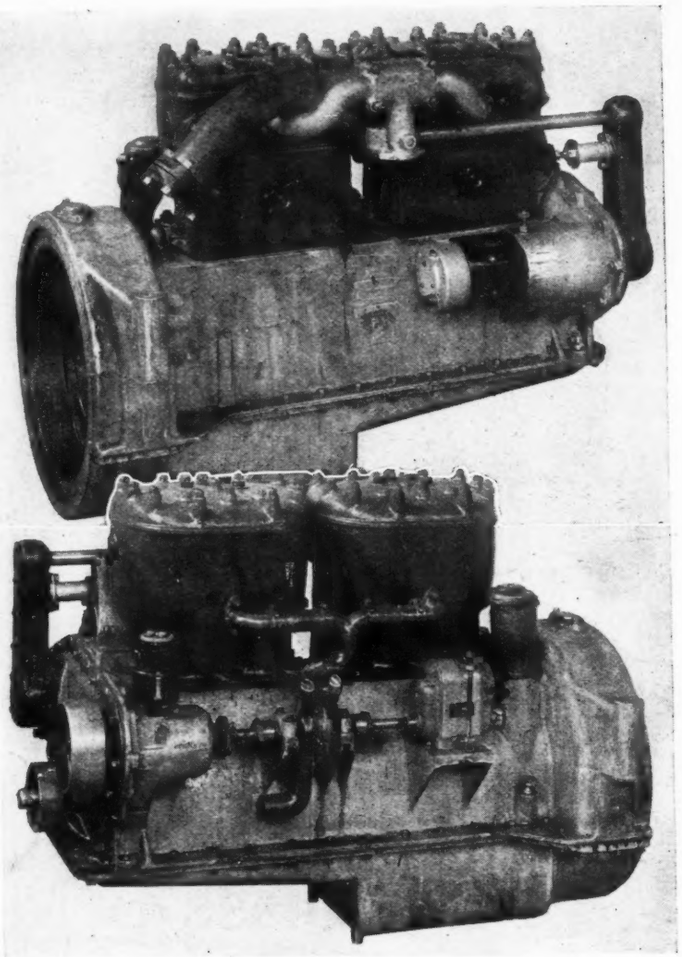
It is a good-looking chassis; the parts are, of course, the very last word in design, and they look it. The first impression of massiveness gives way to a second, which is that the proportions are wonderful. No piece looks stronger or weaker than the adjacent part. Of course, eye judgment is unscientific, but it is an accepted fact among engineers that a job which is not right seldom looks right.

There is room for criticism, naturally; no doubt some things will be discovered that can be improved; but one thing—highly important on a military truck—for which the

Principal Elements in U. S. A. Army Truck

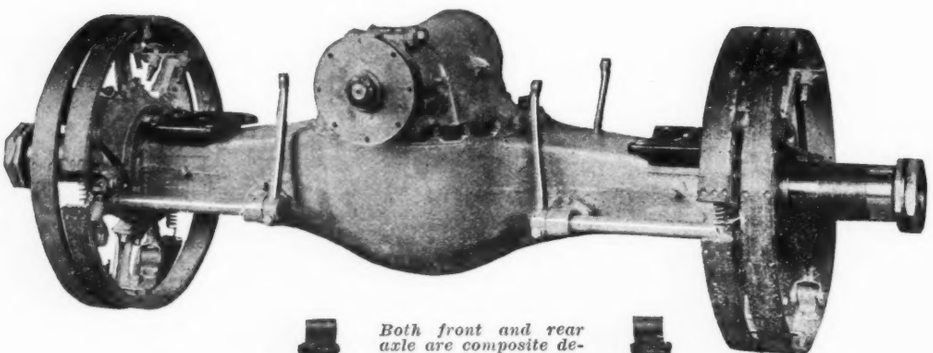


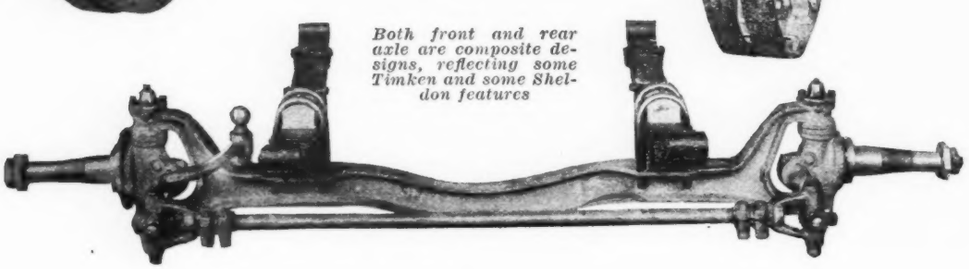
The radiator is a massive cast type and is well protected by a heavy guard



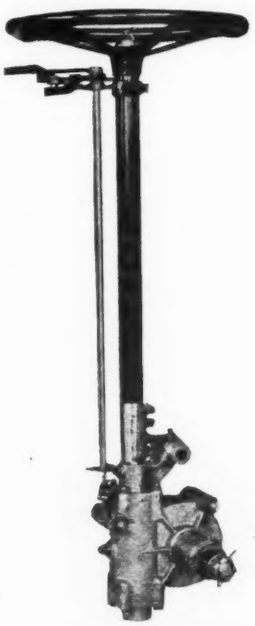
The engine weighs 1012 lbs. and the parts were built by several manufacturers. The cylinders, gearcase and some small parts are Continental; cylinder heads, crankcase, manifolds, push rods, etc., are Waukesha. Wisconsin made the lower part of the crankcase. The pistons are Hercules and the timing gear system a combination

One distinctive feature of the gearbox is the mammoth filling fixture which has been provided





Both front and rear axle are composite designs, reflecting some Timken and some Sheldon features



The steering gear is a massive construction with interchangeable parts

body of men who designed it deserve the highest praise, is the excellent accessibility of everything. *There is not a single part which is likely to require attention that cannot be reached easily.*

This is the more remarkable when it is remembered how entirely this truck is new. It is not new in the sense of a new model of an established make. It embodies spark plugs, a magneto and a carbureter that are not special parts, and these are absolutely all that have not been designed and made just for this truck. In the lamps, for example, there is not a screw that was not designed in Washington. The timer distributor does not employ a single piece that is a stock piece of any make.

World's Greatest Engineering Achievement

As an engineering achievement in the manufacturing line there is only one instance in the world's history which in any way compares with the building of these trucks. That was the Liberty motor, and without any wish to in any way belittle that wonderful accomplishment, it may be said that this truck chassis offers perhaps the more romantic story of the two.

The design called for, first, the agreement of specialists on each part, and, second, for the co-ordination of the results reached by each group. From first to last each part of a chassis has an effect upon other parts. There is nothing so rare in automobile practice as a perfectly coherent design, and the instinct of the specialist is to try to persuade the others to conform to his ideas for his part.

The early stages of discussion on the design of this truck brought this point out very strongly, and probably nobody except those who actually did the work will ever realize the amazing way in which every man's attitude changed from the individual to the collective in a matter of days.

It was a wonderful thing to watch, a still more wonderful thing to take a part in. It has proved beyond all dispute that the truck engineers of America are a group of men deserving the lasting respect and the congratulations of the engineering profession throughout the world. Nor is it fair to confine this to the engineers, for each engineer has been backed to the limit by his firm.

From the time the work was really started there have been no obstacles, no jealousies; nothing but a pull-together spirit that has made it possible to do in days what normally would have taken months.

The most impressive thing about the whole achievement, the thing that needs the pen of a Kipling to do it justice, is the speed of action in the factories. Blueprints, still damp, left Washington every few hours; often in the hands of special messengers. Hours, or sometimes days, before telegrams had passed from the man in the capital to his plant, specifying the material required. On the arrival of the prints or pencil sketches the raw stock was waiting, the machines cleared for action.

Tons of material have gone from place to place by first-class mail, special delivery; within a week the Selden company, which assembled one of the chassis, received no less than 1200 lb. of castings and small parts in this way. Large parts have traveled on limited expresses, the messenger with them buying a bunch of first-class tickets so as to be able to get the weight on board as personal baggage. Men have sat day and night in express cars jealously guarding a gearbox or a steering gear. Others have made 500-mile jumps to get a contact breaker arm or some other trifle to its destination faster than the mail could do. East and West shops have been running day and night, often with the small experimental staff working with only interval enough to snatch a 15-minute meal or a 3-hour sleep for many days on end.

It is not possible, having regard to the immense number of parts and the many factories engaged, to say that the military trucks were built in so many days, hours and minutes, but it is possible to state that the whole job took nearer 3 weeks than a month, and that no entirely new truck has ever been designed and built in less than 6 months. No truck with *every* part new, as in this truck, has ever been built inside a year.

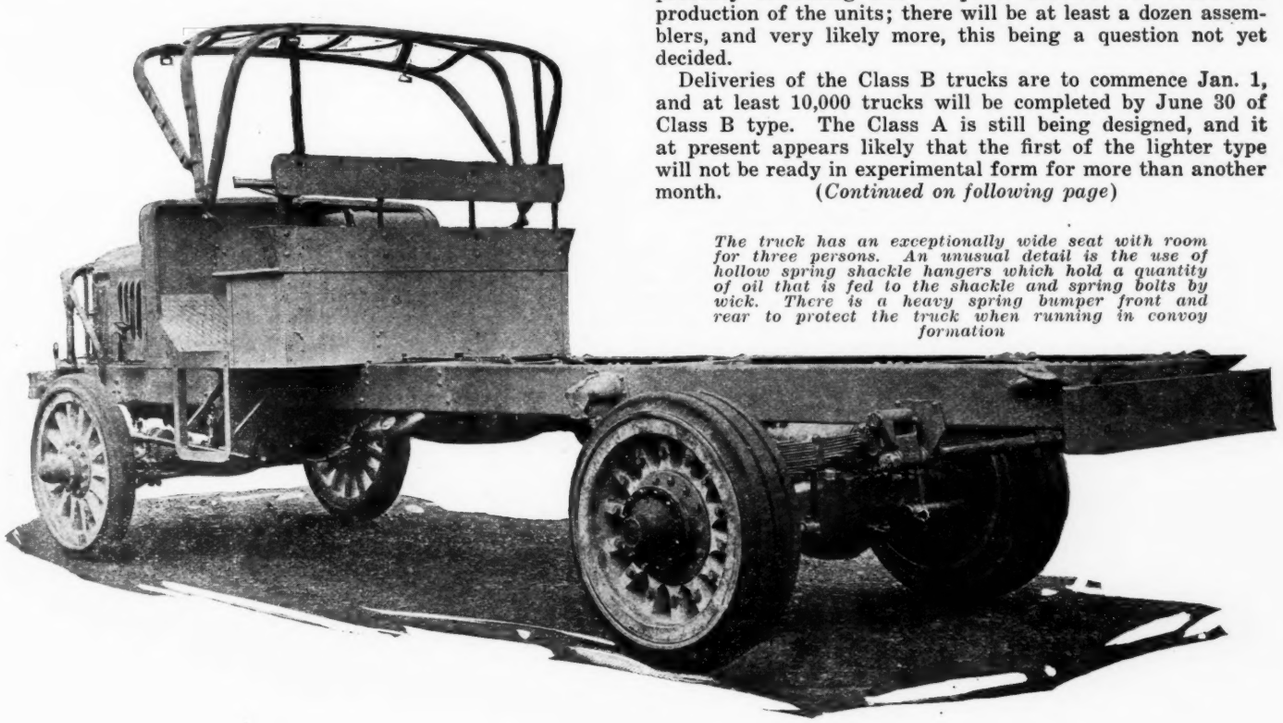
Makers Who Assembled the Trucks

The two experimental trucks have been built by the Selden company of Rochester and the Gramm-Bernstein company of Lima, each having an order from the War Department for the work and each buying the parts from the various sources of supply.

In production the parts will be bought by the War Department direct from their sources and supplied to different assemblers, who will be paid on a cost plus basis.

The production trucks will bear no distinguishing marks of the assembler except for War Department identification purposes. Nor indeed will any of the parts. Altogether probably something like 50 parts makers will share the production of the units; there will be at least a dozen assemblers, and very likely more, this being a question not yet decided.

Deliveries of the Class B trucks are to commence Jan. 1, and at least 10,000 trucks will be completed by June 30 of Class B type. The Class A is still being designed, and it at present appears likely that the first of the lighter type will not be ready in experimental form for more than another month. (*Continued on following page*)



The truck has an exceptionally wide seat with room for three persons. An unusual detail is the use of hollow spring shackle hangers which hold a quantity of oil that is fed to the shackle and spring bolts by wick. There is a heavy spring bumper front and rear to protect the truck when running in convoy formation

Class B is the cargo truck which will be used for the main supply columns to the bases, working from railhead to a point whence the lighter trucks will distribute the supplies to the points of use.

It is intentionally too large and too heavy a truck for work very close to the firing line, although it has power and clearance enough to go anywhere if needs be. The main idea in it is durability and reliability, coupled with ease of repair, and the lighter trucks will have the same characteristics; in fact, the differences between the two in general design will be small, apart from the fact that the light truck will have internal gear drive instead of worm. A certain number of identical parts may be used on both trucks.

A rather curious paradox in connection with these trucks is that, while both chassis are absolutely new, there is still nothing new in the design. While the chassis are purely experimental, they have not a single experimental feature. This means that the entirely new design embodies tried and proved ideas only. The effort has been to make the best possible combination of all the best conventional ideas, taking nothing which had not been tried out in a similar form.

It will not be long before the experimental trucks are proved. They will be able to run 200 miles a day, working day and night, as is the intention. In 50 days the 10,000 miles covered should have disclosed any weakness in the chassis, while on the test block engines will have run the equivalent of many times this distance. A test to destruction before production on a large scale is begun cannot be contrived, but a sufficient test to remove all doubts can and will be made. The 10,000 miles will not be easy miles; they will be over the worst of roads and with maximum loads. The drivers will be military truckmen, not specially picked except perhaps for their physical endurance. Every effort will be made to find weak spots where they may be suspected to exist.

It is impossible to believe that there can be any serious fault in the chassis which would not have been discovered in the design, still harder to believe it after the building of the experimental trucks, but this is not going to be an excuse for shirking any part of the road proof which every vehicle should undergo before it can be stamped O.K. by the American Army.

Electric Enameling Ovens at Ford Plant

THE Ford assembling plant in Chicago is equipped with electrically heated enameling ovens. According to the *Electrical Review* 108 heaters are installed in the main oven, by which a temperature of 450-475 deg. Fahr. can be maintained. The enameling department is on the sixth floor. The oven is built in two sections, a pre-heater and the principal heater. It has a cross-section 52 in. in width and 85 in. in height. The main oven is 78 ft. 8 in. long and the pre-heater 30 ft. The oven structure consists of a steel frame with sheet metal covering and a heavy asbestos lining, making the walls 6 in. thick.

The oven proper contains 108-220 volt, three-phase heating units, aggregating 160 kw. These consist of michrome ribbons mounted on porcelain insulators. The heaters are arranged along the floor and both sides of the oven for a distance of 40 ft., the length of what is called the heating section. An automatic controller maintains the temperature between 425 and 475 deg.

The metal parts being enameled are first dipped in a 200-gal. tank of asphaltic enamel, then hung by hooks upon an endless-chain conveyor, which is carried by a sprocket wheel at each end and in the top of the oven. This conveyor makes a continuous circuit; for instance, carrying a metal part first through the pre-heater, then by a semi-circular turn into and through the main oven, thence by another turn to the starting point, where treated parts are taken off and those to be treated are hung upon the conveyor. This loading and unloading place is an open space, outside the ovens, where the dipping tanks are situated. The sprocket wheels, on which the chain conveyor rides, are driven by a 3 hp., variable-speed motor, stationed on top of the oven. The speed of the conveyor is 18 to 36 in. per minute. Metal parts are dipped in enamel and then carried around the circuit, then taken off and dipped a second time and passed through the ovens again; and at the end of the second circuit the enamel is absolutely dry and hard and the parts are ready for assembling. The temperature of the pre-heater is maintained at 225 deg.

Ventilation of the ovens is regulated by two 15-in. smoke-stacks at different points in the roof, by a rotary suction fan driven by a 1 hp. motor, and by pipes at the entrance end of the oven.

Each day's run of metal parts through the enameling ovens amounts to 50,000 to 60,000 lb. per 24 hr., at a cost of 6 to 7 kw.-hr. per 100 lb. This material is made up of twelve different kinds of parts, and the equipment is ample for the enameling required in the assembling of the 72,000 automobiles turned out here in 1 year. By the use of electric enameling ovens there is a pronounced saving in labor costs, as compared with those costs when gas-heated ovens were used. It is understood that with electric ovens the labor costs are only about two-thirds as much as when gas ovens were in use. Another phase of economy is the speed of operations and the uniformity and steadiness at which heat may be maintained. The run of the circuit through the ovens requires only 30 to 40 min.

The ovens, conveyor system, and equipment for applying electric heat to the conditions required were designed by the Ford Motor Co. at Detroit. The initial installation was at the Chicago assembling plant; the second was built at the Columbus, Ohio, branch, and the third is being installed at Minneapolis. The ovens and their equipment herein described are regarded as standardized for other branch plants, and it is probable that there may be a duplication of this installation at each of the thirty to forty branches of the Ford Motor Co. throughout the country.

Facilitate Detachable Head Removal

OF the large number of engines with detachable heads there are extremely few in which any provision is made for "starting" the head when it is desired to remove it. The customary method of prying with a screwdriver is extremely bad for the gasket. Sometimes the head can be started by turning the engine over with the starter or even allowing a few explosions to take place after slacking the holding down nuts. The usual method of removing a gear pinion is to put two threaded holes in it so that cap screws can be used to force the gear off the shaft. Surely a similar provision could be made on detachable heads. Failing this, why not cast a lip on the cylinder block front and rear, and a similar lip on the head, leaving a gap of a quarter inch or so between them? This would allow the insertion of a bar to be used as a lever for breaking the joint. The two ideas could be combined by tapping a hole in the lip on the head, front and rear, and having a cap screw permanently in place. This convenience could be provided at such small cost that expense would not rule it out of any chassis, and it would be very much appreciated.

Combined Side and Trouble Lamp

THE Corcoran-Victor Co., Cincinnati, have a new side lamp which can be used as a trouble lamp. The reflector is clipped to the front door which is hinged at the bottom and a length of flexible wire lies concealed within the body of the lamp between the connector plug and the bulb socket, thus by unhooking the cover the light can be directed downwards to any extent.

New Design for Victoria Top

Special Curtain Cuts Off Wind and Drafts—Intended for High-Grade Body

By George J. Mercer

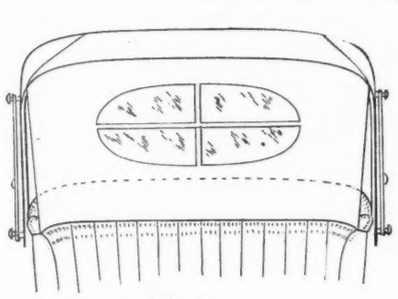


Fig. 2

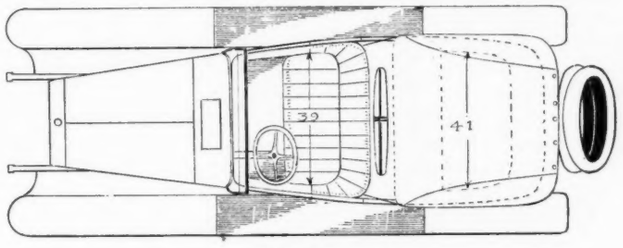


Fig. 3

Fig. 1

Dimensioned drawing of four-passenger Victoria top body, with special wind curtain fastened to top

COMBINATION bodies of various types, but principally the demountable top and the convertible, also called the Springfield, have become more generally used each season on medium priced cars. The combination body has a larger range of usefulness, and every added combination to the touring body that increases the length of time in which it can be used with comfort has found ready support from the buying public. Probably the purchase of a demountable top is often decided by the owner's desire to keep the old body he is accustomed to, when it fills his requirements satisfactorily.

The above prelude is not the forerunner of a description of a new type of combination body, but is an argument to show why the four-passenger body here illustrated has the wind curtain *A* Fig. 1, attached to the victoria top. The victoria top gives the smartest appearance to a touring car for town use of any top that was ever made; on the horse carriage it was the apex of refinement and good taste. It has two drawbacks for use on a motor car; first, it forms a pocket, catching dust and wind, and second, it is a hindrance to the driver in looking back; but its beauty is its great asset, and it would require far greater objections than those cited to reduce its popularity.

The dotted lines from the top forward to the windshield indicate the regulation detachable hood, used in conjunction with side curtains in stormy weather. The curtain *A* does not displace these, but is intended for use when the wind is strong and the weather clear. A tonneau shield is often used for this purpose, and while this latter will take the shock from the wind it does not come high enough to prevent the wind from passing over the top and setting up air currents in its rear; therefore the usefulness of the curtain *A* will be easily apparent, because it will carry the wind up over the top. The slant will facilitate this as well as minimize the wind pressure against the celluloid light, illustrated in Fig. 2.

This curtain can be made from any black waterproof material, or if the top itself was not made of leather then the curtain would be made from the same material.

It would be an inexpensive addition and when not required for use could be folded away out of sight. When in use it is intended to be secured to the back of the front seat by curtain fasteners and then carried over the top and fastened to the back bow, in the same manner as the detachable roof hood. Being flexible it conforms to the round of the front bow, the manner in which it envelops the front being illustrated in Figs. 2 and 3. Fig. 2 is a cross-section at the back of the driver looking toward the rear, while Fig. 3 is the plan view looking from the top, and as shown on Fig. 1; its use in no way detracts from the good looks of the top and body.

It might be well to say at this time that substitutes for leather for the covering for victoria tops are becoming more general. Leather unquestionably gives a richness that cannot be surpassed, but is stiff and hard to fold down, and if folded too often will develop wrinkles that cannot be removed, whereas some of the cloth substitutes that do not have a varnish finish fold easily and close, while being lighter in weight they make the operation of raising and lowering the top much simpler.

The body design to warrant the dressing up that a victoria top gives must be smart but not extreme. That here illustrated is a modern, up-to-date, four-passenger body, having straight lines, four doors, slanting windshield, ventilator in cowl, graduated crown guards and extra tires at the rear.

The best type of the modern four-passenger touring body is not one that is mounted on a chassis so short that there is no other choice, but has a chassis that is capable of taking a much larger body. The seats are spaced so that there is not the slightest semblance of crowding, the rear one being well forward of the axle. Good roomy doors are possible and there is room to spare, so that the addition of pockets and lockers for storage or extra appointments can be easily provided for and the maximum of comfort assured.

There is a tendency to place the extra tires on town cars forward of the front door, but this body is light in weight, and by placing the tires at the back it will help to steady the car, also when placed at an angle they do not appear so cumbersome as when carried in an upright position.

When the room forward of the seat is ample for leg room, the cushion can be lower; this enables the designer to make a lower body side and yet give the appearance of sitting down in the body and not near the top. As shown in Fig. 1, the body side line is a continuation of the hood line; this is the ideal line sought by the makers of touring bodies, because it presents a distinct definiteness that is pleasing at the rear. The line is raised slightly to eliminate a severe ending.

The rear seat back is concealed by the top and is high enough to give support and be comfortable. For the same reason the trimming on the side on this seat ends in a roll that shows above the body side. This roll does not confuse the body line, as it is in from the outer edge sufficiently to leave the painted side line defined. The top of the front seat back is also inconspicuous. The top edge of the body is beveled as indicated by the two parallel lines; at the front the bevel blends into the cowl line; at the rear it is absorbed by the top and trimming; the top shows even with the lower edge of the bevel.

The chassis is 130-in. wheelbase and the principal body dimensions are indicated by figures and by the scale. Any other dimensions required can be ascertained.

A body like this illustration will call for fine workmanship and the appointments that will designate it as a luxurious car. Fine painting and trimming are the twin essentials. The favorite color scheme for this class of body is blue with black leather trimming, or a medium dark green with black striping and black guards and trimming; light colors are used occasionally, but good effects are obtained only with the soft shades of yellow, gray, and brown. When the two latter shades are used one should be on the running gear and the other on the body. With yellow the running gear must be relieved with another color, generally a brown.

The trimming should be black leather in all cases, and the workmanship here is the prime essential, both to establish that finished look that can only be obtained by skilful handling, and also to have the maximum degree of comfort in the cushions and seat backs.

The design of the trimming is limited to the long pipe and point and the plain stitched pleat, the latter having the most adherents on account of its being easier to keep clean, while the former has been continued by body builders who make special work and who claim that it is the safest guarantee for easy riding cushions and backs.

The appointments of a touring body are limited in number. The robe rail, watch, step lights for rear door and pillow foot-rests comprise the total. There should be ample pockets in the doors. The doors are made to open at the front, both for the driver and at the rear; concealed hinges are used and the door handles are on the inside.

—

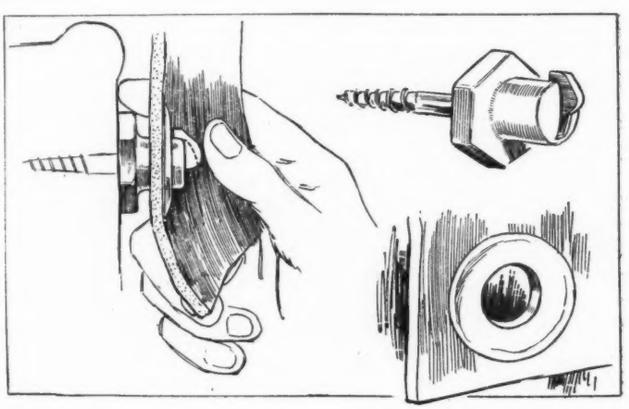
Cinch Curtain Fastener

A NEW curtain fastener, known as the Cinch, has been placed on the market by L. C. Chase & Co., of Boston. Patents on the fastener are pending and the Chase company has the exclusive agency for the sale of the device. The chief claim made for this fastener is that it will not tear the curtain. The fasteners now in common use are secured to the curtain by means of prongs. These necessitate the punching of three or four holes in the fabric, which is very injurious to the material. The Cinch fastener is secured by means of an eyelet and washer, a method that does not tear or weaken the fabric in any way.

From the accompanying illustration the construction of the fastener and its method of operation will be understood. To fasten the curtain the eyelet is snapped over the catch, and to open it the operator grasps the curtain, pushes lightly on the catch with his thumb and raises the curtain. This is a one-hand operation and can be performed from any position.

Another advantage of the Cinch fastener is that it does not depend upon spring friction for its hold, but gives a positive lock, so that the curtain cannot blow open. The fastener is made of nickel-plated brass and is japan finished. Different styles are made to meet all vehicle requirements. The chief mechanical feature is the lock catch, which is simple and sturdy.

Cinch fasteners attaching to vehicle frames with either machine screws, wood screws, or rivets have solid hexagonal heads over which are fitted the bases of the posts, which are also hexagonal. This makes it impossible for the screws or rivets to twist out in attaching.



Nash Brings Out New 2-Ton Truck

Has Tubular Axle and Torque and Radius Rods Are Eliminated—Accessible Adjustments a Feature

THE Nash Motors Co., Kenosha, Wis., is placing on the market a new 2-ton chassis which is not radically different from its 1-ton model. The 1½-ton model will be dropped, though both the 1-ton and the Quad will be retained.

The new truck is designed along conventional standard lines and is built with special consideration for sturdiness and dependability. The engine, which is the same as that used in the 1-ton except larger, is a four-cylinder, L-head, 3¾ by 5¼ in. With a piston displacement of 231.9 cu. in., the horsepower to displacement ratio is 1 to 10.3. A Simplex, four-ball, centrifugal governor limits the engine speed to 1290 r.p.m. and the road speed to 16 m.p.h.

The cylinders are cast in a block and each piston has four rings. Valves are on the right side. Die-cast babbitt bearings are used in the crankshaft and connecting-rod bearings.

A centrifugal pump is used for cooling and in the radiator, which is of the cast tank type with removable core, provision is made to prevent slopping and waste of the cooling water. The fan is a four-blade mounted on a spring tension bracket, driven by a 1-in. flat leather belt. Lubrication is combination force feed and splash, a plunger pump being operated from an eccentric on the camshaft.

Fuel is taken through a Stromberg, Model ME, carbureter with hot air intake from a 16-gal. tank located under the seat. Delco ignition is used.

The clutch is a dry disk. The gearset, which is in a unit with the engine and of the selective type, gives a gear reduction from engine to wheels in first speed of 25.92 to 1; second, 15.187 to 1; third, 8.1 to 1; reverse, 31.42 to 1.

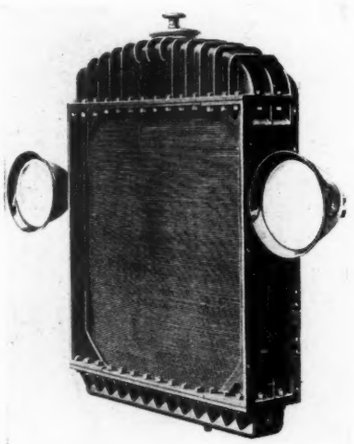
M & S spiral gear differential is used and drive is internal gear. The axle is tubular and somewhat different from that used in the 1-ton job. There are no torque or radius rods, drive and torque being taken through the springs.

The frame is pressed channel steel, with a depth of 6 in. and a flange width of 3 in. The length of the frame over all is: Standard, 203½ in.; special, 227½ in. The width is 33½ in. in the rear and 28 in. in front. The frame is 30 in. from the ground when under full load. The standard wheelbase is 144 in., giving 120 in. back of the driver's seat, and the long wheelbase is 168 in. with 144 in. back of the driver's seat.

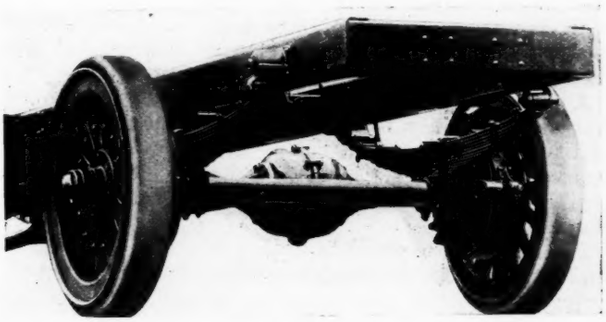
External Contracting Service Brakes

Service brakes are external contracting on the rear wheels and the emergency is of the same type, but located on the drive shaft. This is the same type of construction as is found on the Nash passenger cars. Thirty-four by four solid tires are fitted in front and 34 by 6, solid, pressed-on type in the rear.

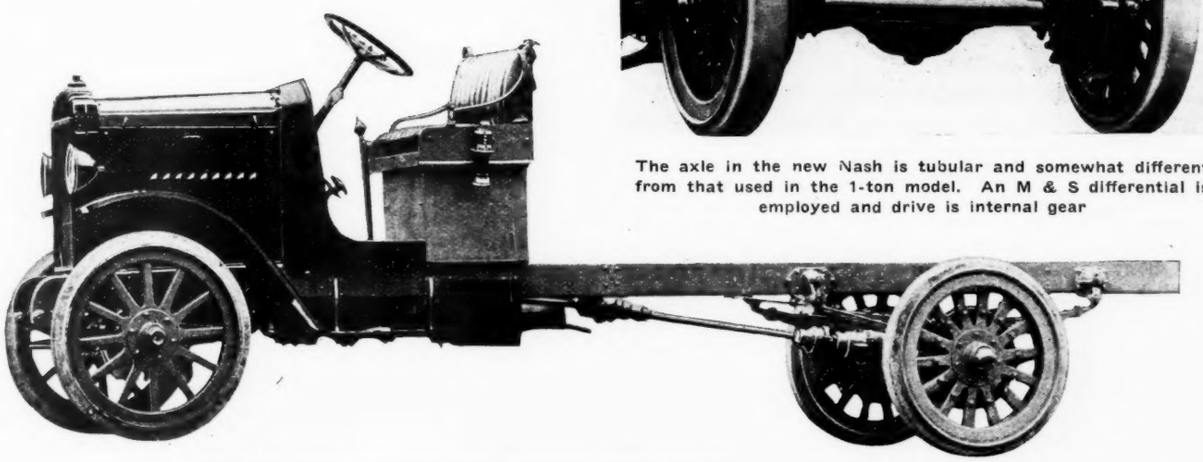
Simple and accessible take-ups and adjustments are provided for the clutch, steering connections, brakes, driving pinions, fan belt, etc. Ground clearance is 9¼ in. and all trucks are equipped with electric starting and lighting with the usual complement of tools, etc. Prices of the Nash line are: 1-ton, $1,495, 2-ton, standard chassis, $1,875, and the Quad, $3,250. The new model comes in lead finish without body at the price quoted, but if body is ordered, the body price includes painting of both the body and chassis.



The radiator on the new Nash 2-ton vehicle is a massive cast type with a removable core. Provision is made to prevent slopping and waste of water. The fan is mounted on a spring tension bracket



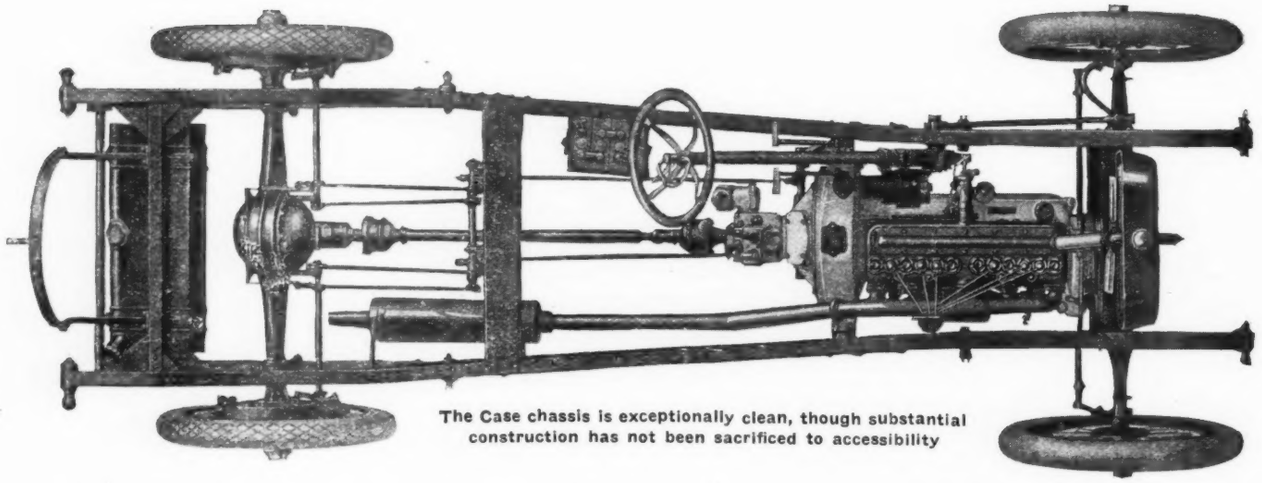
The axle in the new Nash is tubular and somewhat different from that used in the 1-ton model. An M & S differential is employed and drive is internal gear



The Nash frame is pressed steel of channel section and the standard wheelbase is 144 in.

Case Adopts Continental Engine

Abandons Four Built in Case Factory—New Model Is Lighter—Detail Well Worked Out



The Case chassis is exceptionally clean, though substantial construction has not been sacrificed to accessibility

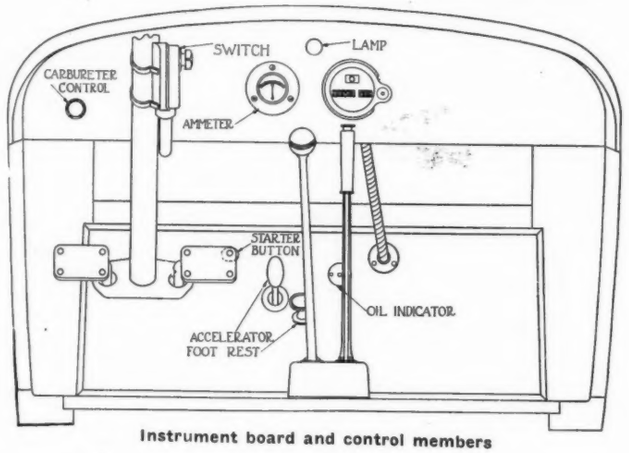
THE J. I. Case Threshing Machine Co., Racine, Wis., makers of automobiles, trucks, tractors and agricultural machinery, have abandoned the building of their own engine, and their car for 1918 will be fitted with a Continental six 3½ by 5¼ in. The car as a whole is larger, the wheelbase being increased to 125, or 5 in. more than last year. In bodies there will be a seven passenger, a four passenger and a Springfield type available.

The Case scheme in this chassis is to employ well tried units and to assemble them with discretion. The parts comprise the Continental engine, Borg & Beck clutch, Grant Lees three-speed transmission and Columbia axles, spiral bevel drive. The electrical equipment is all Westinghouse, the carbureter a Rayfield and the fuel feed by Stewart vacuum from an 18-gal. tank at the rear of the frame.

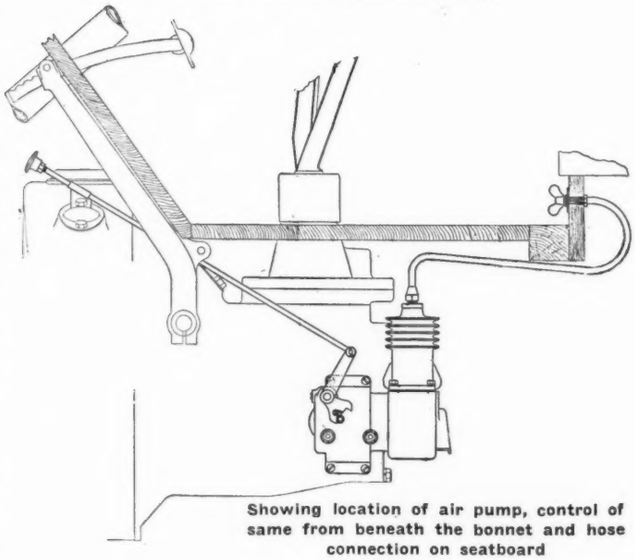
A noteworthy chassis change is the substitution of half-elliptic springs for the cantilever type used for the past few years, Case thus being one of the first firms to go back to the simpler layout. Hotchkiss drive is used. Rigidity is sought by the employment of a 6-in. deep frame.

The appearance of the car as a whole is very much improved, the design being completely modernized. As compared with the four-cylinder, the radiator is taller, and the shoulders of the hood have been brought up to give the smooth, straight slope from radiator to cowl. The shield at the front of the radiator has been brought down to a decided inverted V and the whole front is flatter and at the same time more graceful. The top of the body line from cowl to rear seat is horizontal, and seat-backs in both the seven and four passenger model project several inches above this line. The whole design gives a conception of speed, which is enhanced by the sloping windshield.

The side curtains open with the doors, and when not in use fold into the top. Marshall spring cushions are among the comfort features. The interior furnishing of the car comprises mahogany paneling in the cowlboard



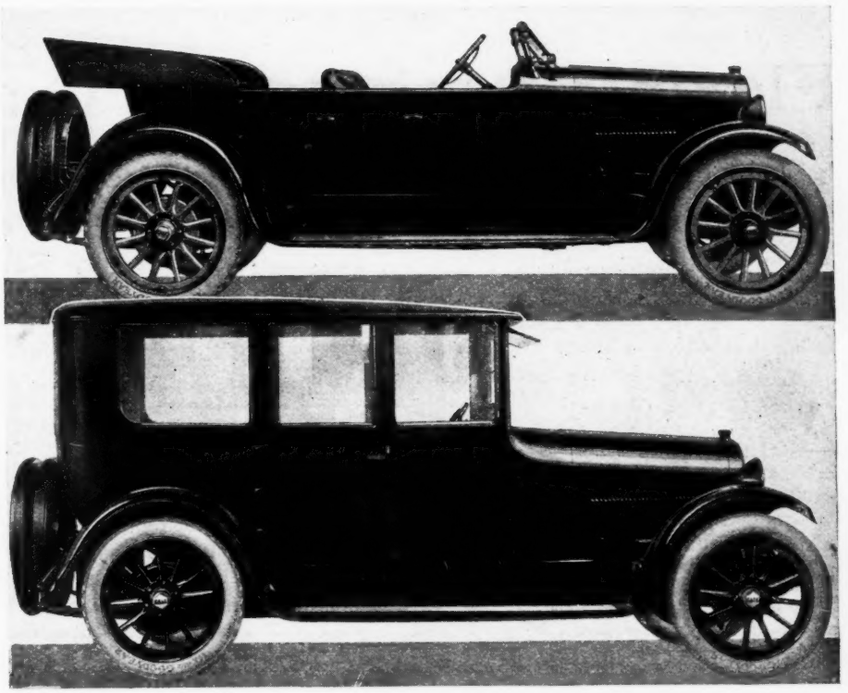
Instrument board and control members



Showing location of air pump, control of same from beneath the bonnet and hose connection on seatboard

and at the rear of the front seat. The extra seats disappear into the backs of the divided front seats and are dustproof. Tonneau lights are arranged in the backs of the front seats, headlights are of the double-bulb type and are adjustable horizontally and vertically. Tire carriers are provided for either one or two spare tires, or one wire wheel, and wire wheels as extra equipment

The tires are larger than on the old car, being now 35 by 4½ in., and the equipment also includes a Stewart speedometer and Stewart tire pump. The latter as well as the former is driven from the grearset, and the control has been worked out nicely. Very often with a gearset located tire pump the control for throwing it into gear is inaccessible and the attachment for the hose hard to make. On the new Case the rod for throwing the engagement lever is brought up at an angle and through the dashboard, where a button is found upon raising the hood. The hose connection appears just below and in front of the front seat, a permanent copper tube line linking the pump to the hose socket.



The new Case car has an entirely redesigned body in addition to its new Continental engine. The open car is the Sport model at $1,875, and the other is the Springfield type sedan at $2,375

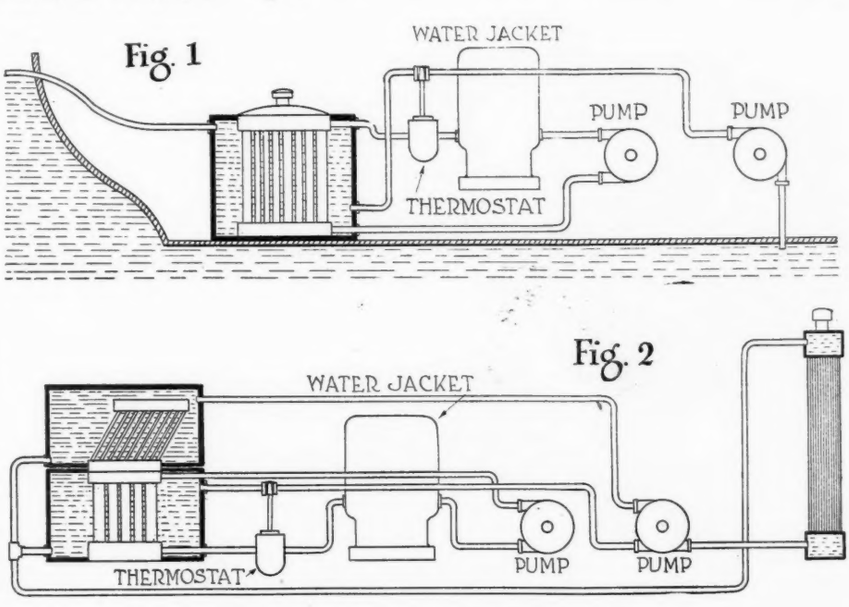
System for Maintaining Constant High Temperature in Waterjackets

ANOTHER novel system of cooling internal combustion engines has been devised by Louis Cammen, having as its object the maintenance of a constant temperature throughout the waterjacket. The inventor claims that his system has several advantages over the conventional thermostat control, particularly for airplane and motor boat work. Fig. 1 illustrates the marine application, which is the simplest and therefore the best for illustrating the principle.

Firstly the cylinder jacket; a small radiator and a pump are linked together in conventional fashion, but the radiator is immersed in a water tank and this tank is kept filled by a second pump drawing its supply from the sea. A thermostat is placed in the outlet line from the cylinder jacket to the radiator and this controls a valve set between the second pump and the waterjacket which surrounds the radiator. Thus there is at all times perfectly free circulation through the cylinder jackets and the radiator, which means that no steam can be formed in the cylinder head until the whole of the water in the circulation is practically at the boiling point. The radiator can be small since its heat is very rapidly transferred to the body of water surrounding it, and it is stated that by properly adjusting the thermostat valve the waterjacket temperature can be kept as high as 210 deg. Fahr. without any risk of boiling.

The airplane and automobile applications are similar except that there is of course no sea to draw on for supplying the cooling tank in which the radiator is immersed. To replace this a conventional radiator is used, water being circulated from the radiator through the cooling tank and back to the radiator by one pump while the other circulates through the engine and the immersed cooler. It may be mentioned that the calculated size of the cooler complete with its waterjacket having 50-hp. engine does not greatly exceed 12 in. in length by 6 in. in diameter.

For automobile applications Cammen suggests still another refinement to permit the employment of alcohol and to prevent freezing. This consists of a small condenser linked up with the submerged cooler and immersed in a separate tank kept supplied with the coldest water available from the main radiator. This layout is shown in diagrammatic form in Fig. 2.



Diagrams of Cammen cooling control systems

Flexible Universals Gaining Favor

Experiments and Practical Use Now Provide Formula for Strength—Should Employ Smallest Number of Disks of Largest Possible Diameter—Concentric Pattern Has Advantages for Some Applications

By C. A. Schell

EDITOR'S NOTE—*The flexible disk coupling is a very old idea, first applied to automobiles by Isotta Fraschini in 1911. It was taken up extensively in England after the invention of the Hardy fabric and rubber disk, which was a great improvement on leather. This coupling is now used extensively in Europe on light and heavy vehicles, where it has proved very durable when properly designed and fitted. It is inherently inexpensive, but is only reliable when the principles of its action are properly appreciated and allowed for.*

AFTER very extensive experimenting with different types of construction and fabric in the manufacture of disks for universal joints it was learned that to obtain maximum service the best grade of fabric would have to be used; a duck made from Sea Island cotton was chosen, one which is noted for its uniformity of tensile strength and which would give the maximum service. Of course many other grades of duck were naturally tried out in order to manufacture the disks as cheaply as possible, but it was found that with the cheaper materials and even with the medium priced materials deterioration was too rapid when the joint was under actual service.

Many experiments were also made to determine the best way of placing the layers of fabric in relation to one another, but no improvement could be made on the method by which the English disk patented by E. J. Hardy was made up. By actual tests it was found that the disks made up in the ordinary way—that is by placing one layer of fabric directly on top of the other, with all the weave running parallel—had only about 70 per cent of the strength of the Hardy disk, and that in actual service the ordinary disk lasts about 60 per cent of the time of the Hardy construction.

Strands Laid for Strength

By laying the sides of each alternate piece of fabric from 8 to 12 deg. in relation to the preceding layer a uniform strength is obtained from one bolt hole to the next throughout the disk. This is so because cotton fabric is stronger in certain directions. The straight strand in the direction of the weave is much stronger than the cross strand or warp, while the greatest stretch will come in the resulting direction of these two strands, or, in other words, on the bias. Thus by placing the weave of each layer in a different direction, as shown in Fig. 1, the strength from one bolt hole to another must naturally average up. In Fig. 2 *ACE* are the driving bolts and *FBD* are the driven. Obviously from *A* to *F* the pull is parallel to the filler, which is the strongest part of the fabric and has the smallest amount of stretch, but from *C* to *B* and *E* to *D* the lines of force are on the bias and excessive stretching will result. From this sketch it can be seen that no matter where the holes happen to be punched the strength and stretch will be uniform when the disks are placed as shown in Fig. 1, but if all layers are placed alike two of the sections will be much weaker and stretch more under stress than the third section.

In a 5/16-in. disk eight of these layers are generally used, in the ⅜-in. nine and ½-in. twelve. Each layer is impregnated with a material which makes it as nearly as possible water and oil proof. The whole disk is then compressed and cured so that proper flexure is obtained, and when the disk is complete the material has a tensile strength of 3400 lb. per square inch. With the use of Sea Island cotton and a very good friction rubber and with proper curing these disks harden very little under service, and the oil or water they are likely to encounter on the average chassis will not affect them. In this respect they differ very greatly from

Fig. 1—Arrangement of layers in Hardy disk

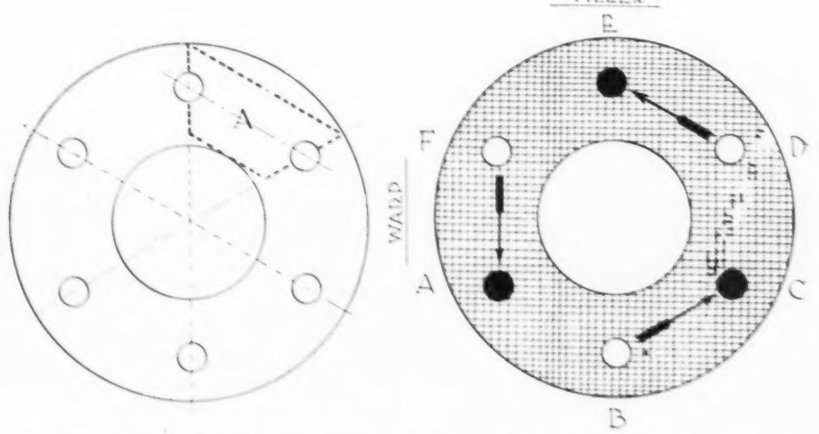


Fig. 2—Diagram showing how drive is transmitted from driving to driven bolts. ACE are the driving bolts, FBD are the driven

leather or from disks made up of cheaper fabric, as leather in particular dries out and eventually cracks, while it has not the elasticity when subjected to an overload that the fabric disk has; consequently it does not give the cushioning effect to the entire running gear that is obtained with the use of the high-grade fabric. Sea Island cotton is very elastic and will stand a great amount of stretching without taking a permanent set. With lower grade cotton if a disk be made stiff enough to withstand the load it will stretch very little without breaking.

Run 40,000 Miles on Original Disks

Several four-ton trucks equipped with this type of joint have run 40,000 miles on the original disks, which still look good, and in England several joints are under service which have run longer than both these installations. These installations were on the rear propeller shaft; so for service between engine and gear box this type of coupling should stand up as long as the metal parts on the majority of the present-day chassis. At the present time in England very many truck manufacturers are using flexible joints between engine and transmission, and a large number are using it on the propeller shaft. One of the largest installations in use at present is that one used on the British tanks behind the 100-hp. Daimler engines. On several of these chassis a disk 12 in. diameter by 1 in. thick is required to transmit the torque.

For installation between engine and gearbox only the torque with a factor of safety must be dealt with, as the misalignment is very slight and consequently only the angular torsional load is to be considered. There is a growing opinion among American truck engineers that for this application the fabric disk will replace the metal joint almost entirely within a short time. Not only does it eliminate service at this point due to its needing no lubricant and to the fact that it cannot rattle, but, being flexible, it adds to the life of the vehicle on account of its shock-absorbing qualities. The disk can be so designed, with the use of good fabric, as to allow from 4 to 8 deg. wind when the load is suddenly applied. At the present time about twenty-five American makers are using fabric joints and about twenty-five others are experimenting and contemplate adopting it.

As a clutch coupling two types have been used very successfully, the most common being the three-armed spider type and the other what is called the internal and external flange type. The latter looks very neat and works out very well and requires a much smaller amount of fabric to transmit the given load, but, due to its construction, shown in Fig. 3, it can be seen that the angle through which it can safely be operated is limited; consequently where a rather large amount of flexibility is required the three-armed spider type is more desirable.

With the internal flange type the writer has made no extensive experiments to determine the amount of angularity which it will stand, but this is all dependent on the amount of free fabric between the two driving rings. The method of calculating the capacity of this type of coupling is very simple; the maximum stress is at the outside diameter of the inner ring, and to obtain the capacity multiply the tensile strength times the effective material at the outside diameter of the inner ring. For instance, if the outside diameter of the inner ring be 4¾ in. the periphery of this ring is approximately 15 in. and if the thickness of the disk be ⅜ in. then we have approximately 5.6 sq. in. of effective material; consequently the ultimate tensile strength times the effective material equals the shearing load at the outside diameter of this ring. In laying out a coupling of this kind the writer has found that a factor of safety of 12 has been ample, and even with this high factor a very small, compact unit is the result.

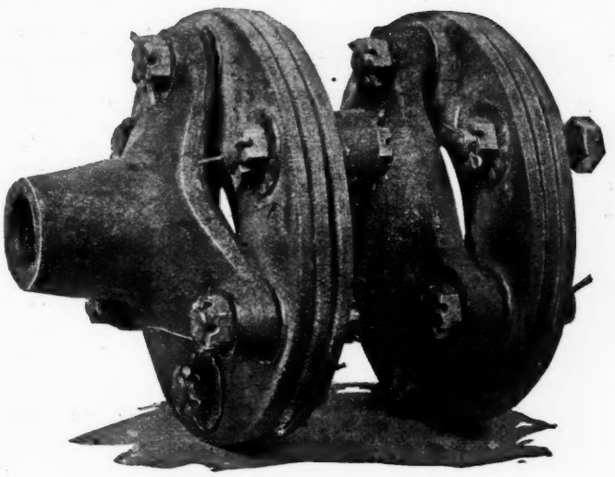


Fig. 4—Double flexible disk type universal joint

Of course it will readily be seen that the outside diameter of this type of joint is dependent upon the amount of flexibility required. In other words, to use this type of joint where a fairly large angularity is required it is necessary to allow considerable distance between the outside diameter of the inner ring and the inside of the outer ring in order to obtain a fairly large width of free fabric.

One manufacturer of high-grade passenger cars is using a disk 7½ in. outside diameter by ⅜ in. thick, with a 4¾ in. inner driving ring. The engine is a 4-cylinder and has a torque output of over 200 ft. lb., while the car weighs approximately 3500 lb. This company has been using this type

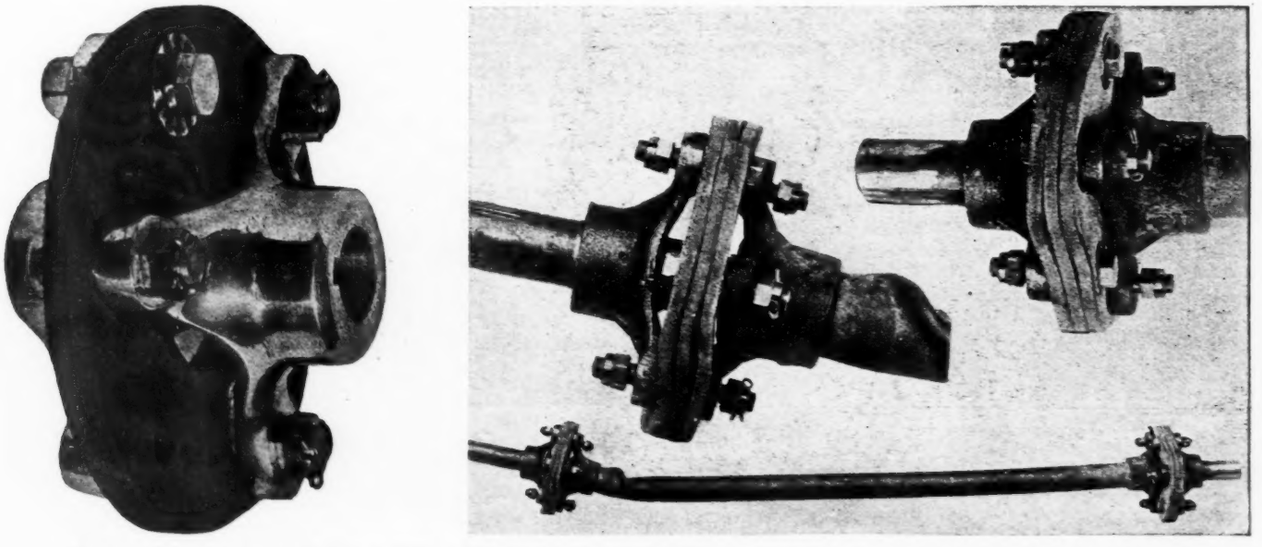


Fig. 5—Three-armed spider type of flexible disk universal joint and a test in which a 2-in. tubular propeller shaft was twisted

of coupling for over three years and has as yet had no failures. In using the three-armed spider type as a clutch coupling the writer has a formula for figuring the capacity, a result of very extensive tests.

In laying out a flexible joint for the propeller shaft many things must be taken into consideration. The angle through which the joints must be operated and the amount of lateral movement required, due to the changing of the axle centers, are the most important factors. The writer has several joints under observation which are working on both passenger cars and trucks at a normal driving angle of 5 deg. with a maximum angle of 9 deg. each, and they are showing up very well. Several other assemblies are being used where approximately 1 in. of lateral slip is encountered. Where excessive angularity or slip is required it is naturally best to use disks as large as possible within reason. The larger diameter would, of course, place the bolts at a larger radius from the center and cut down the driving stresses proportionately; the disk can then be made thinner and will therefore be more flexible.

Within the next two or three years this coupling will be more readily applicable, due to the fact that engineers are designing their rear springs flat under normal load and are laying out propeller shafts as straight as possible. This tendency will cut down the movement of the axle and make conditions better for the use of this joint.

Two Thin Disks Superior to One Thick One

It should be also borne in mind that two thin disks are better than one thick one, for the joint will have more flexibility, and the friction between washers and disk is less than where one disk is used. It should also be remembered that the entire driving effort should be transmitted by *friction* between the surfaces of the spider, the washers and the disks, so that generally the larger the frictional surface the better the gripping effect. Of course the size of the washer and the spider face is limited; if it be made too large it will naturally cut down the angle through which the joint can be operated.

It is also essential to use good-sized driving bolts. In some of the assemblies the writer has investigated it has been the habit to use bolts which were too small, and when they were subjected to a severe shock they were very easily bent. This was especially so when three disks of fairly good thickness were used, because the outer disks pulled on the bolt at quite a distance from the spider face. The driving bolts should be a good fit in the spider and should be pulled up very tight. Much of the success of this joint depends upon the type of washer employed. The face of the washer should either be fluted or have a finely knurled face, and the corners on the outside should be smooth to avoid cutting the fabric. In cases where poor washers are used the disks will gradually pull out at the bolt holes.

It should also be borne in mind that the washer should be plenty thick enough, as with the use of the ½-in. or ⅝-in. driving bolts a washer of thin material will curl up on the ends. By actual tests with a good type of washer, and using Sea Island cotton with the layers assembled by the Hardy method, the writer has determined the sizes of disks for various loads. These figures have been thoroughly tried out and have given very good results. The torque capacity for these same size disks with American fabric was actually 65 per cent of the above figures, and with the Sea Island cotton, using the straight method of assembling the disks, was only 75 per cent of the above figures.

The figures for the American fabric were an average, for some of the pieces tested ran much lower than even 65 per cent of the above figures, as this material was found to be very treacherous. Of course, these figures are for the three-armed spider type, which has proved very successful, and can be made fairly compact and allows plenty of flexibility.

When the disks are well assembled with good washers with the three-arm spider type it is impossible to tear the fabric, as when a great overload is applied the disks will stretch so that the edges of the driving spiders will touch the edges of those driven. This action never takes place on the car because that amount of flexibility is not allowed, but in making dynamometer tests the writer has found that to tear the disks they had to be cut and tested in sections.

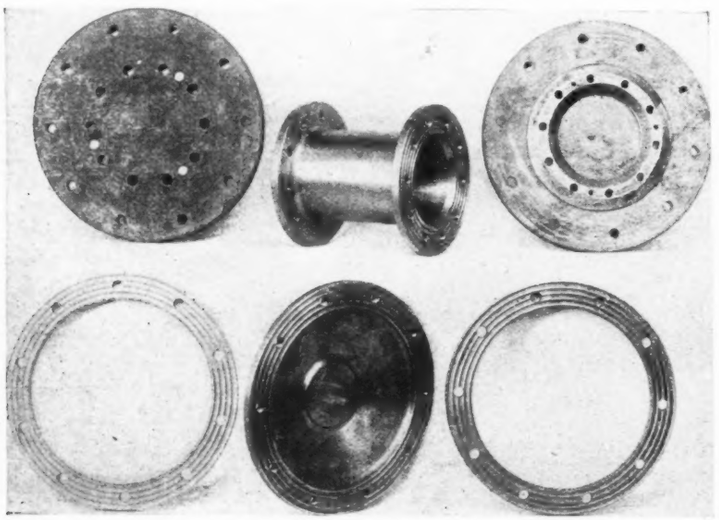
In the torque capacity chart the 7½ in. by 5/16 in. disk has a capacity of 2100 in.-lb. The writer has tested a disk of this size with an 8000-in.-lb. load without any failure, as the fabric simply stretched so that the arms interfered; if the load was released the disk came right back to its original shape. Fig. 5 shows a test of three 7½ in. by 5/16 in. Hardy disks, the 2-in. 10-gage tubular propeller shaft twisted at 21,700 in.-lb.

Capacities of Hardy Disks Made of Sea Island Cotton

O.D.	I.D.	B.C.	3/16	¼	5/16	⅜	Bolts
5	1⅞	4	585	724	985	...	⅜
5½	2⅛	4⅜	710	930	1,170	....	⅜
6	2¼	4⅝	810	1,080	1,350	1,620	½
6½	2½	5	...	1,260	1,575	1,900	½
7	2⅝	5¼	...	1,375	1,730	2,110	½
7½	2¾	5⅝	...	1,685	2,100	2,530	½
8	3	6	...	1,930	2,380	2,880	⅝
8½	3	6¼	...	2,160	2,710	3,250	⅝
9	3¼	6½	...	2,300	2,890	3,470	⅝
9½	3¼	6¾	...	2,650	3,320	3,960	⅝

The torque capacities given above are in inch-pounds and are for three-arm spiders. If two-arm spiders are to be used multiply the capacities given by 0.66 to obtain the carrying capacity in inch-pounds. Owing to the fact that the washer drives by friction, reduction of area by bolt holes does not have to be considered. With the three-arm spider construction the effective area equals three times the section *A*. Then 3*A* times tensile strength times mean radius equals the shearing strength of the disk. The tensile strength for the Hardy disk is 3500 lb. per sq. in.

The flexible joint is very easy to assemble and in case of accident can be very readily replaced. It can be manufactured slightly cheaper than a high-grade metal joint, and it is a sound insulator between rear axle and frame.



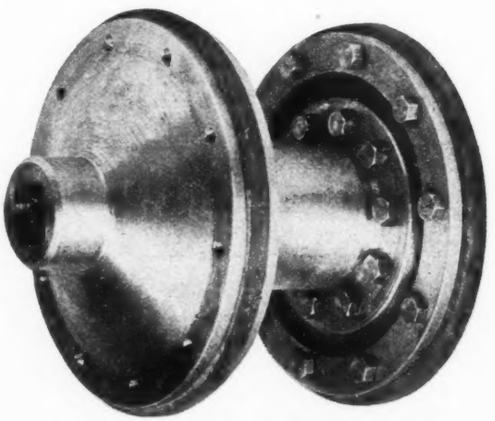


Fig. 3—The concentric type of flexible coupling is very effective and good when made of adequate diameter

Two-Cycle Engine Analysis

Part II

Why the Two-Stroke Has Made Such Slow Progress—Advantages of Various Systems and Offsetting Drawbacks—May Yet Displace the Four-Stroke

By E. H. Sherbondy

WITH the three-port, two-cycle engine expansion proceeds in the same manner as in the four-stroke cycle for about four-fifths of the piston stroke, at which time the exhaust port is uncovered and the gases make their exit from the cylinder under ideal conditions. The pressure drop being very rapid, the gases issue from the port at a velocity of more than 3000 ft. per second and their velocity is independent of the port area.

Owing to the presence of burned gases mixed with the fresh charge and the use of constant compression, the fuel and air mixture must be of nearly constant proportion throughout the range of speed of the motor. Mixtures lean in fuel burn so slowly that combustion proceeds throughout the expansion period and after the exhaust and transfer ports have been opened. The incoming fresh charge is ignited and combustion proceeds back to the charge pump (whose volume is usually in excess of the displacement), continuing until the intake port has been opened, whence the flame is propagated throughout the intake manifold and carbureter passages. Even when this phenomenon known as "backfiring" is not downright dangerous it is very annoying. Backfiring may be entirely prevented by the proper disposition of suitable convectors in the passage between the charge pump and the transfer port.

Cause of Four-Stroking

An overly rich fuel-air mixture causes the peculiar phenomenon of four-stroking, that is missing alternate cycles so that the operation of the engine proceeds regularly and evenly, but ignition and combustion of the charge fails every other cycle; and, of course, large quantities of unburned mixture pass out of the exhaust port. Operating in this manner a two or three-port motor will give at least three-fourths as much power as may be secured when operating normally.

The throttle valve may be placed in either of three positions; at the carbureter, in the transfer passage, or in the exhaust passage. The changes in the phases of the cycle brought about by a change in the location of the throttle are interesting and important, but are not within the scope of this article.

To those who are interested in the question of speed range of this type of engine, the author submits his own verifiable experience, having built motors of 5-in. bore with a speed range of 68-2650 r.p.m. and others of 3-in. and under turning up a maximum of over 5000 r.p.m.

Figs. 7, 8, 9, 10, 11, 12, 13, 14 and 15 show other possible forms of three-port, two-stroke motors, all of which the author has built and tested, as well as having witnessed the operation of motors built by other designers embodying some of the same features.

Before discussing some of the other types of engine embodying the two-stroke cycle, it may be interesting to point out a few of the mistakes in design which have appeared in most three-port motors that have come under the author's observation. First of the cardinal sins has been bad port design, as illustrated in Fig. 12: Ports too narrow on arc and frequently too long in the direction of piston travel; restricted transfer passages; bad forms of deflectors and cylinder heads, which show a lack of knowledge of the physical action of flowing gases; insufficient charge transfer pressure, due to too large a crank-chamber or charge-pump clearance; poor systems of lubrication.

In order to improve the volumetric efficiency of the crank chamber acting as a charge pump, an automatic valve may be substituted for the third port. The period for admission of the mixture or air as the case may be is then considerably lengthened. A better form of admission valve is the rotary valve of either disk or cylinder form, as illustrated in Figs. 8 and 13. By this means the carbureter functioning is materially improved and the period of admission may be as much as 210 deg. of crank travel, as compared with a maximum of 90 deg. with the third port.

Convectors

Convectors may be used to prevent "backfiring." Their function is to prevent ignition of the new charge in the transfer passage and crankcase by reducing the temperature of the flashback.

When screens are used for this purpose they carbonize more or less quickly and thus produce a throttling effect upon the transfer. A very excellent form of "convector" is one which constitutes a number of corrugated and plain sheets of steel laid alternately against one another so arranged as to form a labyrinth of tubes. This device will not burn out and is unlikely to become choked with carbon, while it has the further benefit of improving the mixture quality.

In all types of two-stroke motors constructed for automobiles, scavenging of the residual gases in the working cylinder has been carried out by displacement with fresh combustible gases, notwithstanding that many motors have been built which do not use the crankcase as a pump. Nearly all, if not all, two-stroke motor car engines have been designed in a manner that suggests a great lack of understanding of what ought to be the correct physical processes or phases of the cycle. On the other hand, designers of large gas and oil engines have shown a keen understanding of the difficulties of carrying out the two-stroke cycle successfully, and have attacked the problem with a clear vision of what was to be accomplished, namely, that the two-stroke engine is a heat-work conversion machine, and that the thermodynamic processes involved must be carried out in their proper sequence and that special

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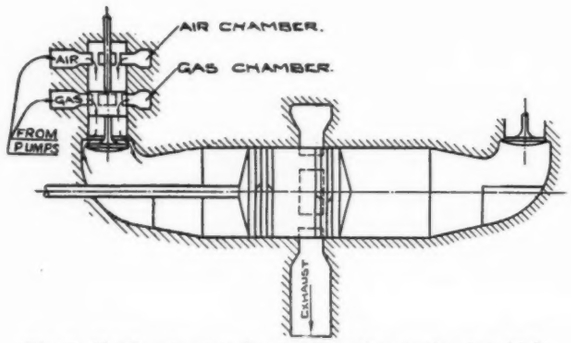


Fig. 5—Korting two-stroke double-acting engine in which air scavenging is employed

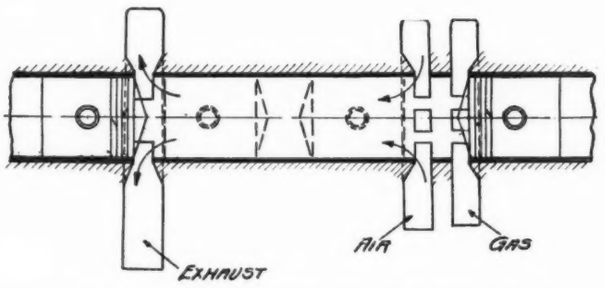


Fig. 6—Diagram showing piston-controlled ports (Oechelhauser & Von Junker)

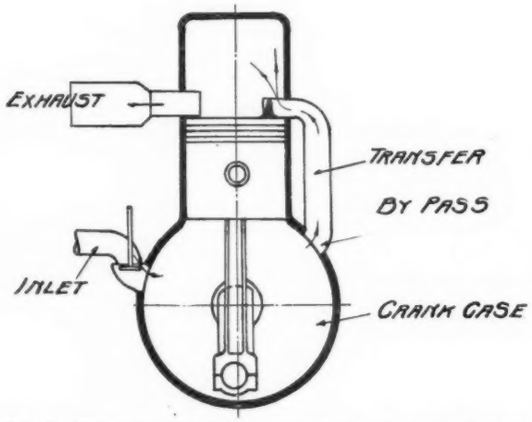


Fig. 7—Day engine in which scavenging is accomplished by the working charge through the transfer passage

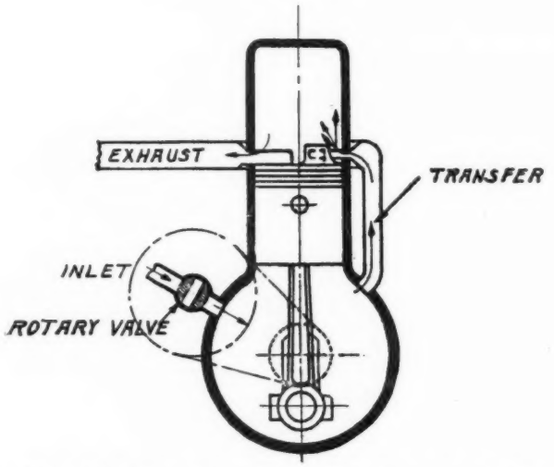


Fig. 8—Two-port engine fitted with rotary type of inlet valve on the crank chamber

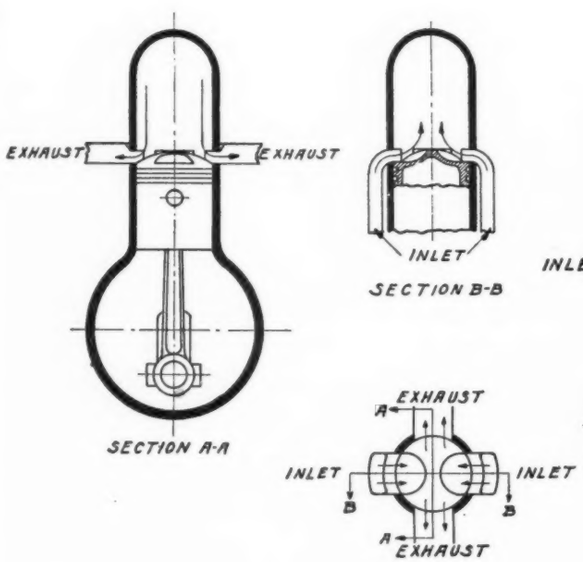
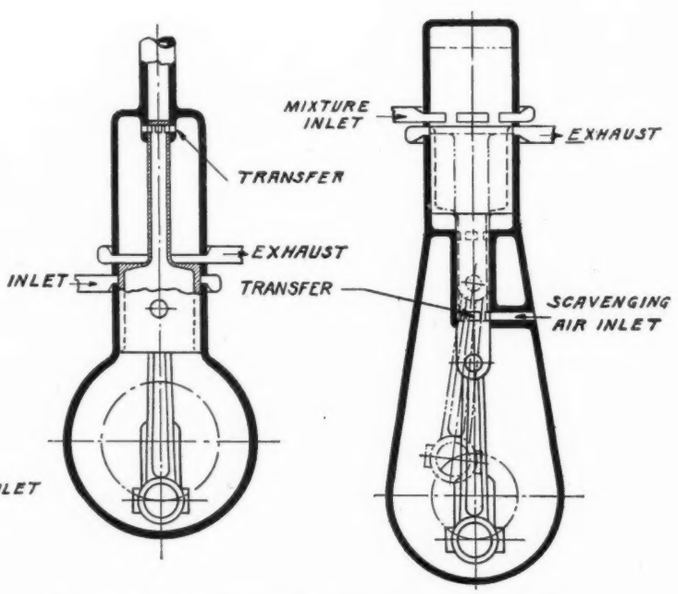


Fig. 9—Knox type motor with double intake and exhaust ports and special deflecting top piston



Figs 10 and 11—Two-stroke engines in which a tubular extension of the piston forms the transfer passage

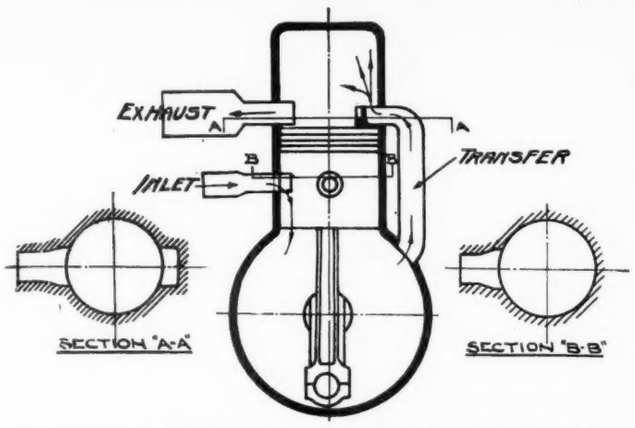


Fig. 12—A two-cycle engine with faulty port design, the ports being too narrow on the arc and too high

study and attention must be given to each of these processes or steps.

The present development of two-stroke engines for vehicles not having passed the embyronic stage, it is necessary to turn to the field of stationary and marine engines of large size, where a great deal of real information is to be had. A large number of Diesel oil engines and large gas engines embodying the two-stroke cycle are in successful operation. The successful motor car two-stroke engine will have to embody the principles found indispensable to the success of large engines.

It may be urged that the conditions of operation of stationary and marine engines are totally unlike those of automobile engines, and because these types of engine are operated at constant speed the solution of the problems involved in their construction at once becomes a simple matter. However, the question is not one of revolutions, but of successively burning and expanding combustible charges, of variable heat supply, to perform varying amounts of work. This is the fundamental case in all classes of prime movers.

Stationary Electric Lighting Engines

That it is quite as difficult a problem to design and construct stationary electric lighting engines, where the speed must be kept constant regardless of the load, as it is to secure the so-called flexibility in engines required for motor-car propulsion there can be no doubt. Precisely the same character of phenomena occurs in the stationary engine cylinder when a heavy load is applied as occurs in the motor car engine cylinder when the operator wishes to increase the speed of his car or to maintain his speed when climbing grades, namely, the throttle is opened to supply more B.t.u.'s

The total heat lost to the walls in the two-stroke engine cylinder is actually less than that occurring in the four-stroke cylinder, as is apparent when the facts are considered.

It will be observed that the cylinder walls in the four-stroke type are exposed to the hot gases not only during the entire expansion stroke, but also during the entire following exhaust stroke. During scavenging of the cylinder, which is due to the displacement of the working piston, the gases are in a state of violent agitation, brought about by the flow of burned gas from the cylinder, which action further promotes the interchange of heat with the cylinder walls.

On the other hand the two-stroke engine cylinder is exposed to gases of high temperature during only a part of the time required for one piston stroke, and owing to the rapidity of action of the governing elements at the end of expansion, pressure equalization with the surrounding atmosphere is brought about in the engine cylinder in approximately one-twentieth of one piston stroke.

A further comparison of the events taking place in the two and four-stroke cycles are illustrated in Fig. 16, which refers to the conditions obtaining during exhaust. The diagram is self-explanatory and calls for no further remarks.

The success of the two-stroke engine is intimately connected with the design of its scavenging arrangements. Complete and intense scavenging is not only a desideratum, but its realization is of vital importance, since on the scavenging depend:

1. The absolute control of positive ignition.
2. Economical and soot-free combustion.
3. The horsepower output of the engine.

It is only during half the time that the four-stroke engine carries out a real working process. The other half of the time required for the cycle of operations the cylinder becomes a pump, whose efficiency is necessarily limited by the construction necessitated in a working engine cylinder. The volumetric efficiency is impaired by the large clearance required for combustion chamber functions, and conditions are further aggravated by the presence of residual gases whose temperature may be of the order of 400-600 deg. Cent.; serious limitations are imposed in the design of valves and valve gear. In addition the high temperature of the cylinder walls, piston head and valves brings about strong heating of the charge during the suction stroke. How large the effect of slight pre-heating of the charge may be is shown by the following calculation:

Assuming that one-twentieth of the total heat of combustion be imparted to the charge, the latter will sustain a rise in temperature of from 80 to 100 deg. Cent. To this would correspond a diminution of charge weight of 20 to 25 per cent. The mean pressure of the

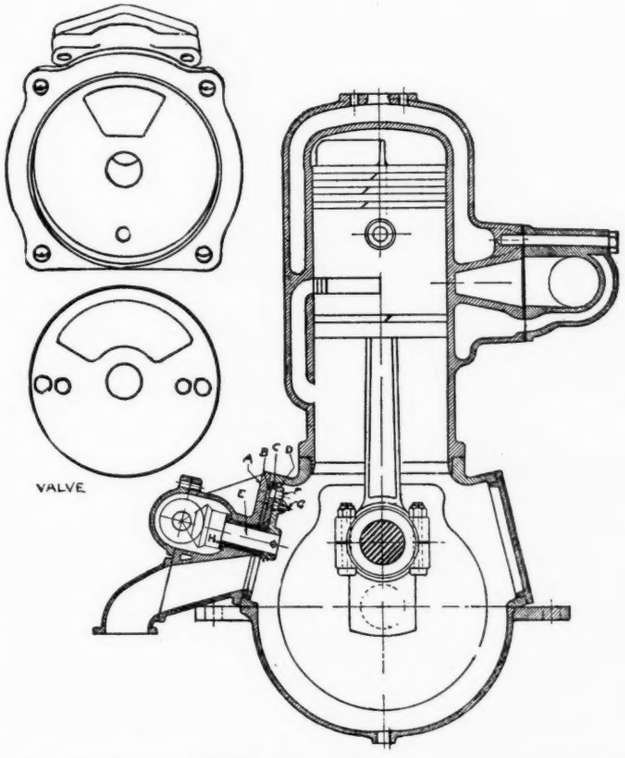


Fig. 13—Two-cycle engine, with details showing the rotary disk valve and valve face

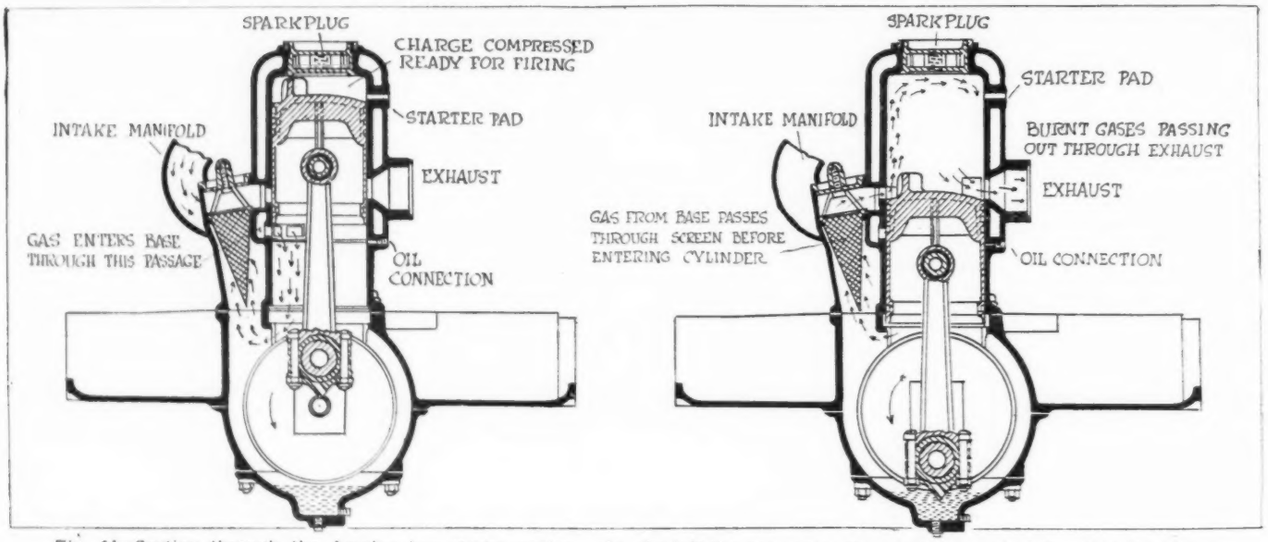


Fig. 14—Section through the Amplex two-stroke engine. At the left the gas enters the crankcase and at the right the charge passes through screens to the cylinder

diagram of work will show a drop of at least the same percentage, without reduction in the temperatures during combustion and expansion.

In the two-stroke engine, however, the pumping actions may be carried out in a separate pump, designed for explicit functions. The pressures required being less than in the working cylinder, the pump may be kept cool, the port area may be made sufficient, the air or gas, as the case may be, can then be delivered to the working cylinder with only a negligible rise in temperature; in short, the pumping phase of the cycle may be carried out efficiently. Great advantage arises from the fact that the charge volume is not limited by the displacement of the working cylinder; supercharging may thus be carried out, with the effect of increased M. E. P. The design of successful scavenging arrangements entails the following predicates:

1. A long cylinder of as small a diameter as possible and of simple interior. This is equivalent to an engine having a large ratio of stroke to diameter; a perfectly smooth scavenging space devoid of any re-entering or protruding parts liable to retain spent gases.

2. Exhaust and scavenging ports of ample size.

3. Precise and positive governing and rapid opening of the exhaust and scavenging parts.

4. Obviating scavenging air inlet elements in the combustion chamber.

5. Design arrangements of such character as to allow super-charging to be carried out, i.e., when it is desired to raise the M. E. P. above the normal maximum the cylinder may be charged to more than atmospheric pressure at the beginning of compression.

It will be observed that

(Continued on page 635)

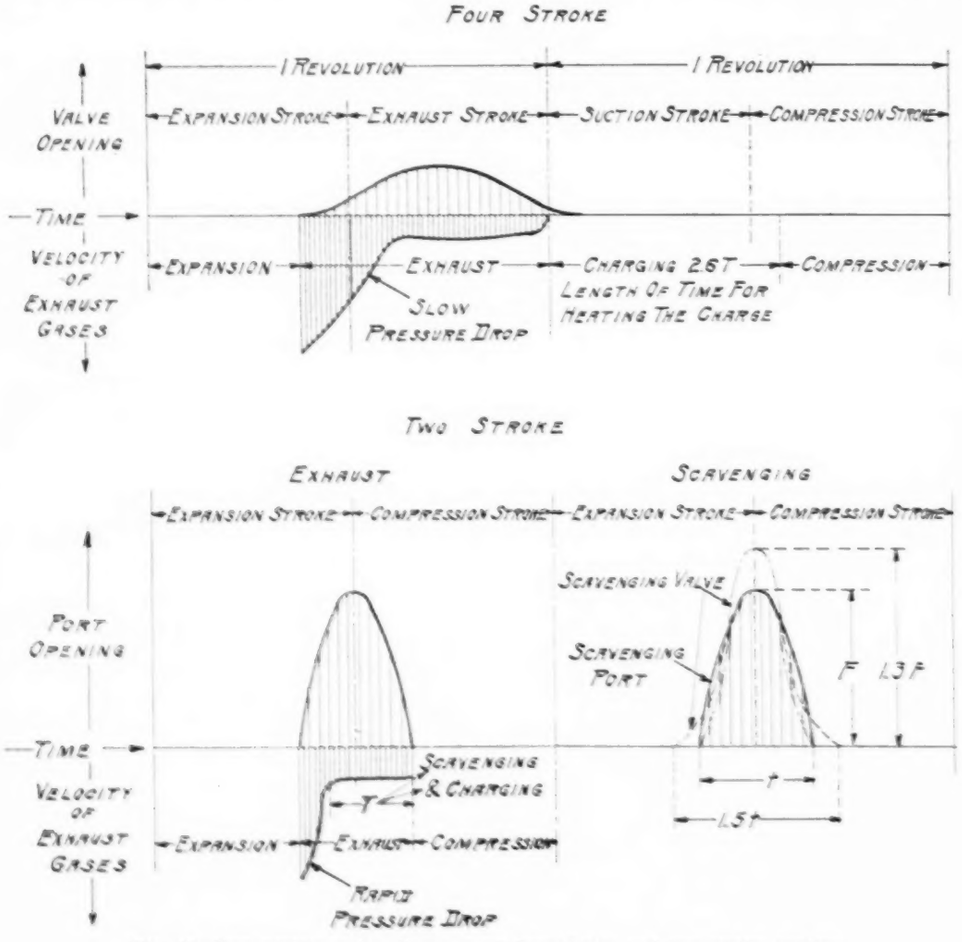


Fig. 16—Comparative valve diagrams of four-stroke and two-stroke engines

Nieuport "Plane-and-a-Half" Speed Scout

Principal French Fighting Machine, a Crosswise Between a Monoplane and Biplane, Has Rotary Engine of Le Rhone or Clerget Type Made Both as Single Seater and Two Seater

FULL descriptive details and numerous halftone illustrations and line drawings of the Nieuport speed scout have recently appeared in German aeronautic papers, and thence found their way into the British aircraft press. We reproduce herewith two drawings of this machine, which the Germans designate as a "plane-and-a-half." It forms an intermediate step in the transition from the monoplane to the biplane and consists essentially of a machine with a large top plane and a small lower plane. This design was first suggested in 1910 by a Swiss engineer named Schneider, who was then engaged with the Nieuport firm, and is intended to combine the advantages of the monoplane, viz., speed and easy handling, with those of the biplane, which are stability and short span.

At the present time far more Nieuports are in use by the French Army than any other type. Many single-seaters and some two-seater Nieuport planes have been captured, but there is considerable variation in their construction, which is, no doubt, due to the fact that they are manufactured in different plants. This, the German airplane papers state, is a great handicap in connection with the repair and upkeep of the machines in the field. Besides, improvements are constantly being made and further variations result from the fact that different motors are fitted. The motors are always of the rotary type, and the single seaters usually have an 80 hp. Le Rhone and sometimes a 110 hp. Le Rhone, while the two seaters are fitted with 110 hp. engines of either Clerget or Le Rhone make.

Rotary Engine Used in Chasers

Rotary engines were much used by the French at the beginning of the war, and they are still more extensively used at the present time. For chasers the rotary engine has completely replaced the stationary type. At present the light single seater predominates among chasers, and for this the rotary engine of light weight and short overall length possesses important advantages. It is evidently the aim of the heads of the French aerial forces to provide as many units as possible, and this plan has much to recommend it. The loss of a unit is not of much importance and, besides, small units are more difficult to shoot down, especially when they fly at high altitudes. They are superior to large machines on account of their greater climbing power, speed and manageability, not only as regards attack from the ground, but also as regards attack by enemy airplanes.

The fighting value of a small single seater is equal to that of a large two seater, even when the latter has two machine guns, of which one is fixed and the other is worked by the observer. It is seldom possible to use both guns simultaneously, while on the handy little single seater good use can be made of the rigidly mounted gun. This has been proved by the air successors of Boelke, Immelmann and many others, who nearly always flew single seaters with fixed machine guns. As up to the present time the machine gun is the weapon must suitable for use aboard an airplane, the single seater chaser with the machine gun is best adapted for fighting enemy planes over land.

Returning to the Nieuport "plane-and-a-half," it is built according to French construction methods in vogue previous to the war, chiefly of wood, with a fabric covering. The fuselage is a rectangular girder construction with diagonal wire bracing. Toward the rear the section becomes trapizoidal, as the bottom of the fuselage is narrower than the top. The stern ends in a vertical rudder post. The top of the fuselage has a curved turtle back which is covered with fabric. The longerons are made of ash, but in some instances the front part is of ash and the rear part spruce. Struts and cross members are also of wood, except those in front of the engine struts, which are of steel tubing and are spindled out for the sake of lightness. The fuselage fittings are of sheet steel and are provided with sockets for the struts and with lips for the wire connections. The fittings of various kinds indicate that in spite of the large numbers in which these machines are used, standardization and quantity production have not been obtained. Altogether (says one of the German airplane papers) the French machines give the impression of being hand-made rather than machine-made.

Rotary Engine Permits Compact Arrangement

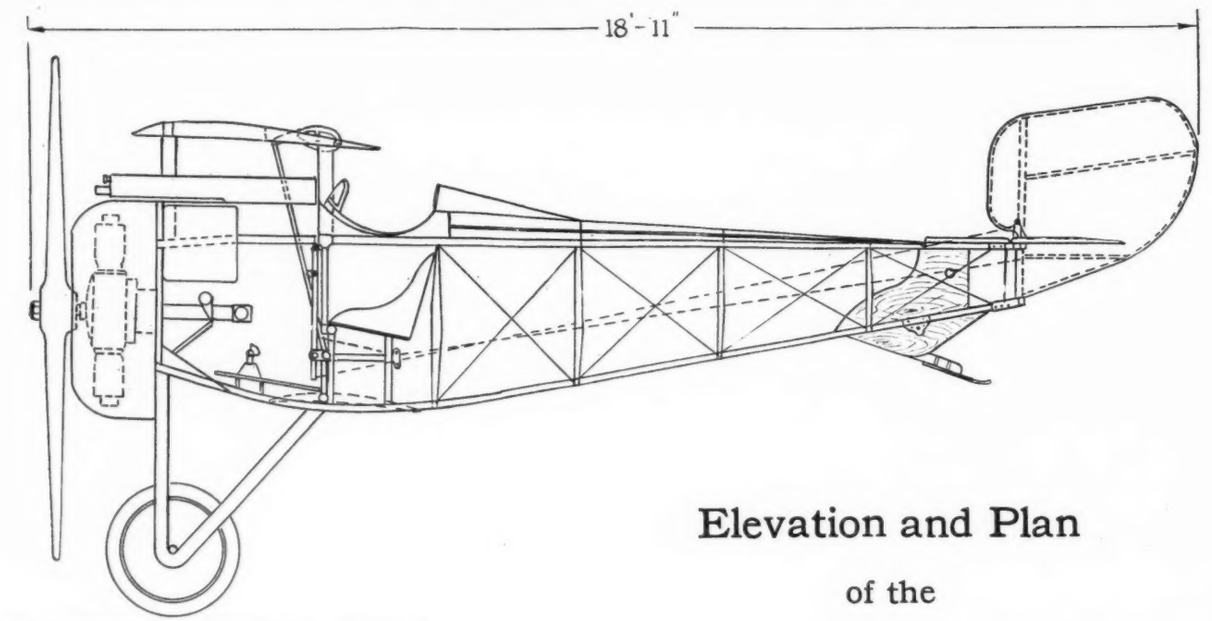
The main loads of the machine are concentrated in a narrow space near the front. That is to say, the engine, the fuel tank and the pilot's seat are located close together. This compact arrangement is possible only with a rotary engine, and it increases the manageability of the machine. The engine is covered with an aluminum hood which, in some cases, entirely surrounds it, while in other cases the bottom is open.

The supporting surfaces vary much in area in the different machines. The upper planes have two spars each, while the lower ones, which are much smaller, have only one spar each. The angle of incidence of the lower planes is much greater than that of the top planes, nearly twice as great. It varies considerably in the different types, ranging for the top planes from 1½ deg. to 3½ deg. The wings have a slight dihedral and backward slope and are heavily staggered, the middle spar of the lower plane being immediately below the rear spar of the top plane. The lower surface of the wings is nearly flat, while the upper surface is deeply cambered, the result being a comparatively thick wing section. In some Nieuport types—notably the two seater Type 15—the top plane has a central section mounted on a system of struts. The cabane varies in construction, but usually consists of four struts. In types having a top plane center section this is usually mounted on six struts.

Box-Type Wing Spars

The wing spars are of box type and generally made of spruce. At the points of attachment they are strengthened with wood fillers. The ribs are of conventional construction, the flanges being of ash and the webs of lime wood. Only the top planes are fitted with ailerons. The chord of these increases toward the tip and they are secured to a steel tubular shaft, the rocking of which actuates the ailerons. To reduce the sharpness of the break in the wing curve at the front edge of the ailerons, strips of fabric inclosing flat steel springs are employed. The tubular shaft for the aileron runs along the rear spar nearly to the center, where it carries a crank lever made of sheet steel. These cranks connect to the upper ends of streamline tubes, the lower ends of which are bolted to a transverse crank lever on the longitudinal rocking shaft of the controls. The ailerons are thus operated by pull and push rods instead of by the usual control cables. The center section of the top plane is covered with transparent material and its trailing edge is cut away so as to provide a better view in an upward direction. The spars of the lower planes are attached to the body by means of ball joints.

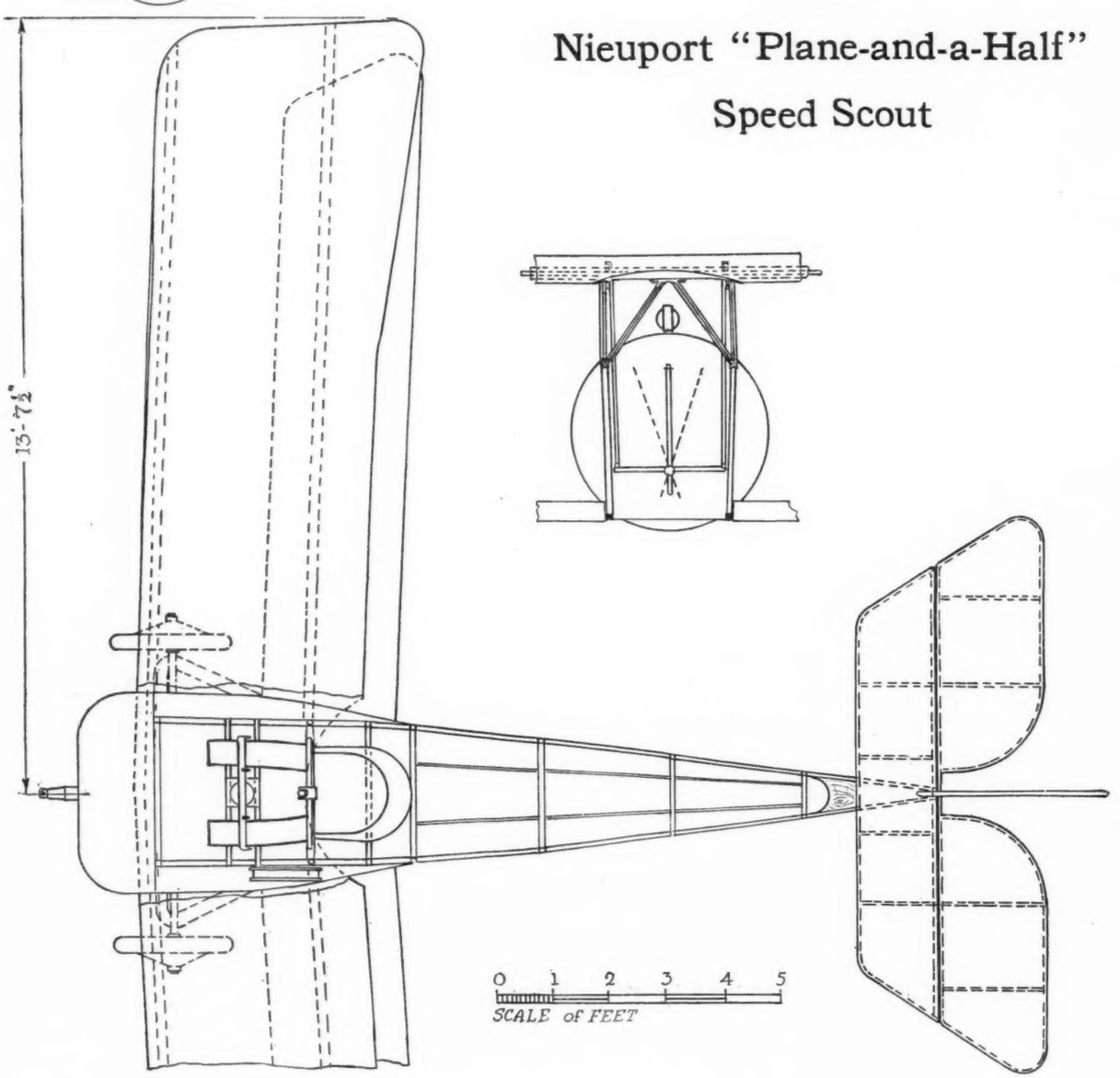
The landing gear is of the simple V type and the chassis struts are made of drawn aluminum tubing of streamline section secured to sheet steel sockets. The axle is sprung by



Elevation and Plan

of the

Nieuport "Plane-and-a-Half" Speed Scout



means of rubber shock absorbers. The chassis cross member connecting the apices of the two V's is of channel section aluminum. The wheel axle is an ordinary smooth steel tube. Nieuport, therefore, apparently has given up his well-known laminated steel spring axle. The tail skid is rigidly connected to the rear part of the fuselage. It consists of a simple wood skid to the rear of which is bolted a slightly curved flat steel spring.

Chief Characteristics of Nieuport "Plane-and-a-Half"—Type II (Built 1916)

	MM.	Ft.
Span of upper plane	7,520	24.7
Span of lower plane	7,400	24.25
Chord of upper plane	1,200	3.93
Chord of lower plane	700	2.29
Length overall	5,750	18.85
Height	2,450	8.27

Wings

	Sq. M.	Sq. Ft.
Area of top planes with ailerons	9	97
Area of bottom planes	4.6	49.5
Total wing area	13.6	146.5
Area of tail plane	1	10.8
Area of elevators	1.34	14.4
Area of rudder	0.58	6.2
Area of ailerons	1.32	14.2

	MM.	Ft.
Stagger of leading edge	680	2.13
Gap	1,230	4.04

	Deg.	M.
Dihedral, top plane	179	..
Dihedral, bottom plane	174	..
Backward slope	170	30
Angle of incidence, top plane	1	30
Angle of incidence, bottom plane	3	..

Weights

	Kg.	Lb.
Top plane with fittings	36	79
Bottom plane with fittings	14.5	32
Tail planes	3.5	7.7
Elevators	4.3	9.5
Rudder	3	6.6
Body with engine, complete	265	582
Bracing cables	3.5	7.7
Wheels	10.2	22.4
Plane struts	5	11
Total weight (empty)	345	759
Pilot	80	176
78 liters (20.6 gal.) gas	55	121
20 liters (5.3 gal.) oil	20	44
Machine gun and ammunition	50	110
Total use for load	205	451
Total weight	550	1,210
Loading	40.4 kg./sq. m.	8.36 lb./sq. ft.
Efficiency of loading	5.5 kg./hp.	12.1 lb./hp.

The engine is the 80 hp. Le Rhone and the propeller a Levasseur of 2500 mm. (90.5 in.) diameter and 270 mm. (10.64 in.) width of blade. The single gasoline tank, which constitutes both the main tank and service tank, is built in in front of the pilot's seat, while the oil tank, which is segment shaped in cross section, is located under the hood directly behind the engine. The engine controls are located to the left of the pilot. A gasoline gage in the form of a glass level indicator is used. The hood over the engine is held in place by means of a steel band.

A machine gun of the Lewis type is fitted on the top plane and has a drum containing 48 lb. It is possible to change this drum with one hand, and the gun is fired by means of Bowden controls. Sights are provided above the body.

Following are some of the climbing performances made with this machine:

1,000 m	4 min.	3,000 m	11 min.
2,000 m	7 min.	4,000 m	16 min.

The top plane is normally built with two main spars, while the bottom plane, which has a small chord, has only one main spar. There is only one pair of interplane struts on each side, and these are in the shape of a V. The rectangular spar of the lower plane is provided with packing pieces that transform its section into circular shape at the point of attachment, and its angle of incidence can therefore be adjusted during the process of erection. The wing covering is tacked on and the loading and trailing edges have protecting tapes glued on.

Two-Cycle Engine Analysis

(*Continued from page 632*)

the conditions of a large ratio of stroke to diameter are in agreement with the requirements of reducing the heat loss to the walls during combustion.

While it is perfectly possible to build a good and efficient two-stroke cycle engine and supply combustible mixture by the ordinary method of carburetion, the increasing limitations of this method of fuel supply owing to the more complex character of the fuel, and the indirect methods which have been and are being developed to minimize these limitations, result in an unwarranted technical compromise, especially in view of the vastly more efficient and thoroughly demonstrated method of forming the mixture entirely within the working cylinder. This does not necessitate the use of the constant pressure cycle or the excessively high compression pressures reached in the Diesel cycle. It obviates the necessity of supplying heated mixtures, with their attendant reduced volumetric efficiencies and excessive combustion temperatures. It allows prompt starting, and absolutely does away with the rejection of unburned fuel from the cylinder, a condition which frequently occurs during rapid acceleration and deceleration of engines using carbureters.

It is therefore suggested that the introduction of the fuel into the cylinder should take place during the compression stroke and at a point where positive ignition will be secured.

In spite of this fact the motor car engine retains all of the original characteristics of its predecessor the gas engine, and there has been grafted into it that accessory known as a carbureter, which was substituted for the gas mixer. Looked at in any light the whole art of carbureter construction can not be said to embrace more than the function of proportioning. The inlet manifold or mixture receiver and the working cylinder are called upon to carry out additional functions in charge preparation, for which they are in the present form but a makeshift, and the insufficiency of the present scheme of charge compounding and combustion becomes more and more apparent as the character of our fuel changes.

That combustion may be carried out in engine cylinders efficiently and without a "correct mixture" has been amply demonstrated in the Diesel and so-called semi-Diesel engines, and it may be said that the fuel supply should be independent of the air supply. This topic, which has been brought up but rarely, is deserving of a great deal more attention than it has been accorded, and its thorough consideration is inseparable from a comprehensive study of the development of internal combustion motors of all classes.

The peculiarities of liquid fuel combustion call for the highest possible compression, together with an excess of air over that required for combustion.

Two Tractor Models from Columbus

One Is a Three-Wheeled Model Driven Through a Single Wheel, the Other, a Four-Wheeled Model, Has a Novel Draft Rigging

THE McIntyre Manufacturing Co., Columbus, Ohio, is now starting production on two farm tractor models in its new plant. It is expected that 10 machines will be completed this month, that 200 will be completed before Jan. 1 and that a daily production of 5 machines will be obtained in the early part of 1918. At present practically all the machines completed are going to the foreign trade.

The first of these models, styled the "Farmer Boy," is a three-wheel type, with a single-drive wheel. This arrangement does away with a differential and permits the tractor to turn in practically its own length. A frame similar to a truck frame is used, constructed of 5½-in. pressed-steel channels, with heavy cast cross-members. The front of this frame is carried on the single steering wheel and the rear on the 50-in. drive wheel, and an auxiliary, or land wheel, and an axle at the rear, serve to hold the tractor in an upright position.

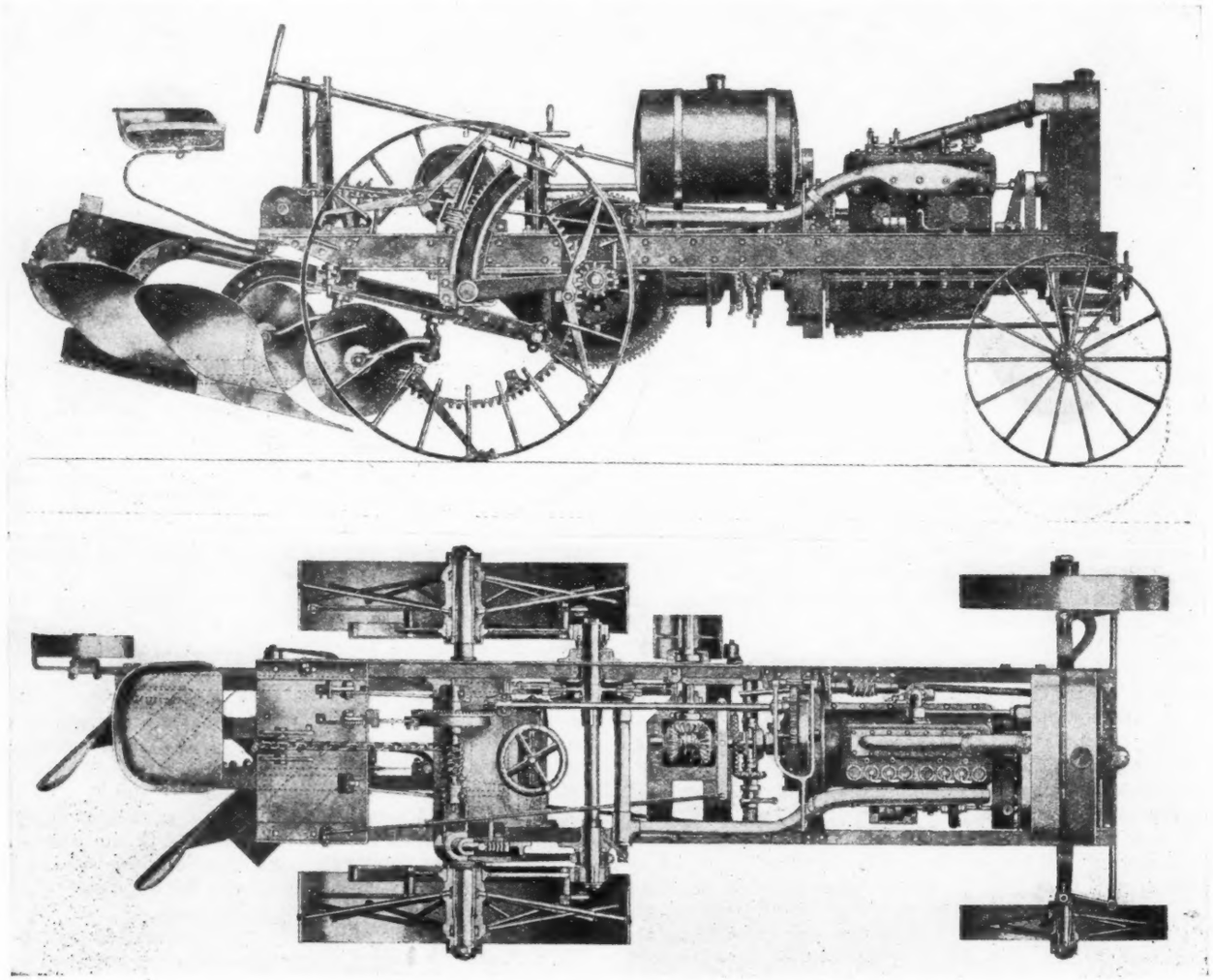
From the radiator back to the rear of the gearbox the construction is similar to that used in a truck. Cooling is effected by a 7-gal. capacity Candler radiator and centrifugal pump. The engine is a Waukesha 4-cylinder, tractor type, 3¾-in. bore by 5¼-in. stroke, designed to operate at from 800 to 1200 r.p.m.

Ignition is by a K.W. high-tension magneto, and a governor is used to maintain constant engine speeds. Either gasoline or kerosene may be used as fuel, as a Kingston two-bowl carbureter is fitted. The fuel is carried in a 19-gal. tank mounted at the rear of the engine over the gearbox.

Special Design Gearbox

The clutch is of the standard Borg & Beck design, of the disk type, and is operated by a pedal from the driver's seat. A special design gearbox, however, is employed. It has only two speeds—one forward and one reverse—and permits a working speed of from 2 to 2¼ miles per hour. All gears in the gearbox are cut steel, carbonized and hardened, and are inclosed in a dustproof case and lubricated by a bath of oil. S. K. F. ball bearings are used on the gearshafts.

Final drive is effected through two pairs of steel spur gears, the first being mounted on a jackshaft at the side of the gearbox and the last on the single driving wheel. All gear reduction takes place through these gears, as there is no gear re-

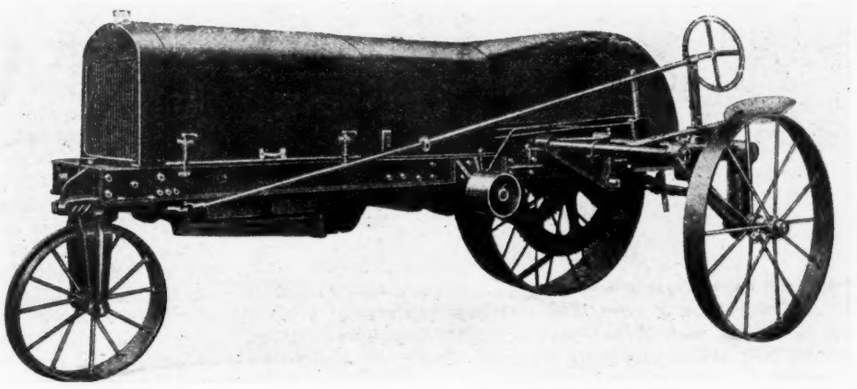


Side elevation and plan view partly in section of Morton four-wheel tractor

duction in the gearbox. A 12-in. belt pulley with a 6-in. face is mounted on an extension of the jackshaft, outside of the frame. This permits belt-driven farm machinery to be operated from the engine, after the driving gears of the rear wheel have been thrown out of mesh. From 18 to 20 hp. is delivered from the pulley, and from 10 to 12 hp. on the drawbar.

Any Farm Implement Operated

Any farm implement may be operated by this tractor. The weight, fully equipped and ready for use, is 3000 lb. The price is $850.



The Farmer Boy tractor, which has a single-wheel drive

No price has as yet been made on the second model that will be manufactured. This model is styled the "Morton," and is a four-wheel type, driven through the two rear wheels. The radiator, power plant, gearbox and drive units are practically the same as those of the Farmer Boy model, though in appearance and in the arrangement of the driving wheels the two differ widely. The rear or driving axle of this model is swung on a quadrant that is operated by a work gear, so that it may be raised or lowered to keep the tractor on an even keel. Another feature is that the plow itself may be raised or lowered through the action of a gear-operated windlass driven by a friction-clutch from the fly-wheel.

Graham Truck Attachment Includes Body

GRAHAM BROS. of Evansville, Ind., believe that in the line of attachments for converting passenger cars into light trucks the proposition that will make the strongest appeal to the purchaser is one offering a complete outfit, instead of an attachment enabling one merely to make a light-truck chassis. In addition to the chassis, a body is required, as is also a cab for the driver. Graham Bros. make an outfit comprising the chassis converting attachment, body and cab. One advantage of the proposition is that when purchasing the job complete, the customer is sure of getting a cab and body that are well fitted to the unit. At the present time upward of 50 jobs are being turned out per day and the factory facilities are sufficient to double this output.

The unit referred to converts the Ford chassis into a 1-ton truck and sells complete with body and cab for $385. A choice of express and stake bodies is offered. The rear axle is of Hess manufacture and is made from a solid steel forging of 1¾ by 2¼-in. section. The axle collars and hub bases are forged on the axle. Bock roller bearings are used. The brakes are of the expanding type, 14 in. in diameter by 2½ in. face, and are Raybestos-lined. Semi-elliptic Hess springs are fitted, 42 by 2 in. A semi-elliptic bumper spring is also provided, extending cross-wise of the frame, as shown in the lower illustration.

Speed 12 to 20 M. P. H.

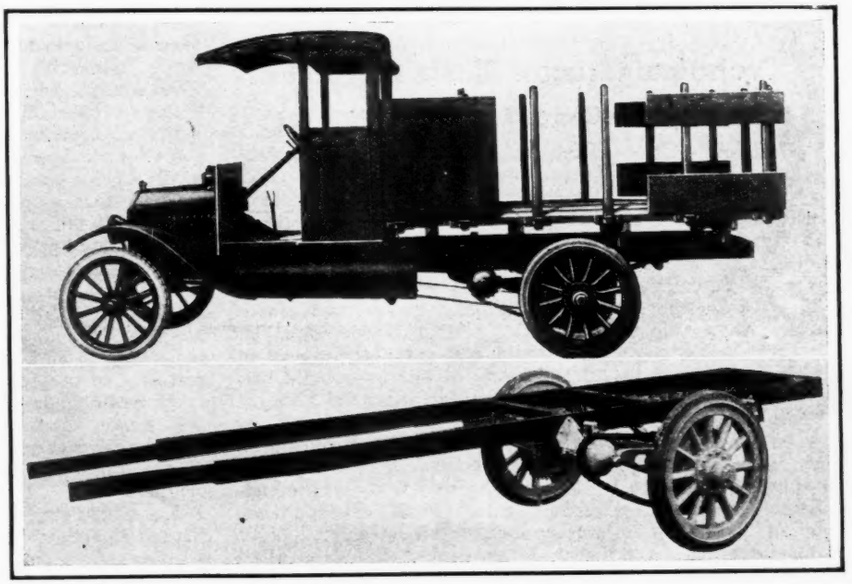
Cullman sprockets are used, with milled teeth, the sprocket wheels being detachable and interchangeable. The final drive is by side chains of 1¼-in. pitch. The wheels are of Prudden make, of the artillery type, with twelve 2-in. hickory spokes, and are fitted with 32 by 3½-in. solid rubber tires. Speeds of from 12 to 20 m.p.h. are obtainable.

The cab is securely ironed and braced and its roof is fully slatted and covered with waterproofed black piled duck. End and side panels are made of cottonwood and well finished; the cab sill is of select ash, the top rails are of cottonwood and the moldings of poplar. The heavy, black, oiled duck back curtain is fitted with a large mica light, and the "lazyback" on the driver's seat and cushion is padded and covered with imitation leather.

The express body is heavily braced and ironed. Its flare boards and panels are of cottonwood, and it has heavy selected ash bars and an oak floor. The loading space is 45½ by 106 in. The panels are 12 in. high inside and the end gate is of heavy design, fully ironed and provided with a full chain. The stake body is similar in design to the express body, having stakes 36 in. high above the floor, and the loading space is 55 by 112 in. Panels on the two front stakes are 27 by 32 in.

The wheelbase of the truck is 125 in. and the weight of the chassis without body is 2150 lb. The frame is made of rolled channels of 4 by 1 9/16-in. section, weighing 5¼ lb. per foot. It is 168 in. long and 32 in. wide.

Graham Bros. occupy a large plant, and some photos sent us show that they have a large supply of material on hand and going through the shop.



The FORUM

Use Two Tractors for Thresher

By C. V. Elliott

IN reading the articles appearing in the recent issues of THE AUTOMOBILE AND AUTOMOTIVE INDUSTRIES I have noticed it has been stated that a tractor ought to be large enough to drive a threshing machine, which is hardly possible with a tractor that will pull only two or, at the most, three plows. I would like to explain one solution to this difficulty which came under my observation this past summer.

My father and brother-in-law each owns a tractor claimed to develop 20 b.hp., neither of which alone is capable of running a full-sized threshing machine to its maximum capacity. They purchased a threshing machine and mounted the threshing cylinder on a shaft long enough to take a drive pulley on each end. Then both tractors were used to run it. The machine is equipped with self-feeder, automatic weigher and wind stacker. The use of two tractors gave most excellent service, which is shown by the fact that in one day 2600 bu. of oats were threshed. The fuel used was kerosene. One company refused to sell a threshing machine to be run with two tractors, claiming it would not work. In moving from one farm to the next one tractor pulled the threshing machine and the other the fuel wagon. Two men operated the outfit where three would have been necessary for a steam outfit.

Ensilage cutting is the other farm job that needs considerable power. There seems to be no reason why the ensilage cutter could not be driven with two tractors the same as the threshing machine.

There is a large unsatisfied demand for a different method of cutting the ensilage which will lighten the labor required. Many farmers will not build a silo because of the very hard work required to fill it.

The solution seems to be to divide the present ensilage cutter and combine the part used for cutting the corn into short lengths with the stalk-cutting part of the binder. This machine would cut the stalks and load them chopped up into a wagon. The wagon would be driven to the silo, where its load could be dumped into a kind of hopper and elevated into the silo. It ought to be possible to build the two machines, the one to cut the corn and the other to elevate it into the silo, at a cost not much greater than that of the corn binder and ensilage cutter together. Such a machine surely has big sales possibilities.

Technical Tractor Tests Needed

By George T. Strite

THE discontinuation of the technical tractor tests at Winnipeg, Canada, was the greatest calamity that ever befell the tractor industry in this country. Present tractor demonstrations do not create an incentive for manufacturers to manufacture enduring machines. A real tractor contest similar to the Winnipeg ones is the only kind that will bring this out. To-day the farmer wants service in the way of enduring tractors rather than attention given poorly made tractors by tractor experts. With technical demonstrations for 1918, many companies would not enter their present machines, and they would be compelled either to build better machines or remain out of the demonstrations.

There must be an accurate record of the plowing capacity of each tractor and also the fuel and lubricant consumed. Records should be kept by official observers of every stop in which work had to be done on the tractor by way of adjustments, repairs, or replacements. Penalties should be imposed for taking on water, fuel, or oil, oftener than at stated intervals. A drawbar dynamometer should be fitted between the tractor and plow on every machine, and the official observer should have a record of the drawbar pull at different times, so that an average for the day could be obtained. Failure of tractors to come up to the rated drawbar should be penalized, and exceeding the drawbar should be rewarded. There should be stock machines the status of which would be verified at the tractor factories perhaps a month or more previous to the demonstrations and verified by a technical committee during the demonstrations. Tests of different duration should be made with different fuels, such as gasoline, kerosene, and probably alcohol. Accurate records should be kept of the tractor performance with these fuels. The most valuable part of the demonstrations would consist in a comprehensive, impartial, official report which would be furnished to all competitors, and other valuable reports which could be widely distributed for publication purposes. These are days when the tractor makers must concentrate all efforts toward development. These are no days to waste dollars and hours on idle demonstrations which tell nothing.

Pressed-On Truck Tires Best

By A. L. Putman

SOME years ago in the infancy of the truck business it was the nearly universal custom to use solid tires of the demountable type so that they could be changed by the use of conventional and common tools when worn out. On the medium or large sizes it was never an easy job to do this, but, given wrenches, crowbars and sledges with a husky gang of men, it could be done.

In Europe the practice from the start was the reverse. They simply, by the use of a press, forced the tire over a plain band tight enough to make it stay until the tire was worn out and then removed in the same manner. Thus an enormous amount of steel was saved and much additional weight taken from wheels in the spot where it did the most harm. So the performance of the truck was improved, fuel saved and tires lasted longer. In the past two or three years this practice has gained ground enormously in the United States, and has the almost universal approval of truck manufacturers. So much so that only trucks going to out-of-the-way localities or certain customers who have had luck with demountable equipment are furnished with that type.

It is even a common sight to see trucks running with pressed on tires having the old demountable bolt holes in the felloe, indicative that the equipment has been scrapped. This subject, which was considered virtually settled and in process of working itself out in the right direction, has been artificially galvanized to life again because the United States Government specifies demountable tire equipment for all army service trucks.

That such a specification is wrong and against the true interest of the service does not matter; the specification is there and will probably stick for some years. As between the two common practices, demountable tires or pressed on tires, there is but one reasonable answer, and it would so prove in war service condition if the condition was provided for as it has been in business. This reasonable provision would only cost a fraction of the money or use a thousandth part of the material so necessary to conserve as it does to equip every truck with demountable tires.

However, there is a better method than either which confers the advantages of one fully and the supposed advantages of the other in a much more convenient manner than the original.

The single steel disk type of truck wheel with pressed on tires is smooth, clean and light at its circumference—in fact, all over. The entire wheel and felloe band weigh little, if any, more than the demountable equipment. It is bolted to

the hub just as the wood wheel is, but, unlike the wood wheel, it is both a suspension and compression wheel instead of all compression; so the wheel is a self-contained unit without the hub and can be readily removed from it without injury or interfering with its functions, and it is not necessary for its support that it fit the barrel of the hub with immense pressure. A reasonable load-carrying seat drawn into the disk and a good sliding fit on the hub is all that is necessary.

Such a wheel equipped with a pressed on tire can be readily removed as a unit from the hub by unscrewing the hub flange nuts. If there should be any tendency to stick holes tapped in the disk of the wheel opposite the inner tube flange enable a wrench, which is provided with a threaded end, to be screwed in and the wheel is readily forced loose. This one tool, a wrench with a socket on one end and a threaded portion on the other, will remove a wheel of the largest type from the hub or fasten it on securely. The nuts at the hub flange are much easier handled than at the rim. It has been impossible to use them as trench diggers, so they are reasonably certain to be in decent condition to unscrew. They can also readily be blind nuts which will keep water out so that threads will be well protected.

The complete wheels with tires pressed on them require no more space than tires only, and are as readily transported and stored. By handling in this manner steel and expense are saved and trucks relieved of considerable non-paying and injurious load. And tires will last much longer, relieved of the pounding effect of the heavy demountable equipment.

A wheel readily demountable has many other advantages in the handling and maintenance of trucks, to say nothing of the advantages the spare wheels give. Brakes, bearings, etc., are readily repaired and adjusted with the wheel rolled to one side out of the way, leaving hub and brake drum on axle.

The same system of mounting and demounting used on passenger cars with pneumatic tires, enlarged and strengthened for the loads taken, will work on solid tire truck wheels. It is not, of course, a job for a gentleman driver, but a much nearer approach to it than solid tire demountable equipment is or ever can be.

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Hints on Case-Hardening Practice

THE following information regarding different phases of the case-hardening process is taken from a paper by R. H. Sherry read before the S. A. E. Detroit Section:

The use of check pieces to determine at intervals the depth obtained will save a good many dollars. Such pieces should be packed near the center of the box or in some position where average results will be obtained. They should be made comparatively small in order to permit of easy fracture. Sizes between ¼ and ½ in. thick are the most convenient. If properly placed in the box, the difference between the size of the test piece and the size of the work will not cause any difference in the depths of penetration obtained, although there is a popular idea to the contrary.

It is very difficult to produce a neutral atmosphere under certain gas furnace conditions, and where gas is used as fuel soft spots may develop owing to excessive scale produced.

Heating in Lead Pots

One form of furnace which will give good results on certain classes of work is the lead pot. For handling fair sized pieces in quantity, with speed and accuracy, it is very satisfactory. In hardening case-hardened work, however, great care is required. The pot should always be covered with charcoal or molten salts, as the fumes given off under oxidizing conditions are very poisonous, and also because under such conditions the lead may become contaminated with lead oxide which readily removes the carbon from the surface of the steel, thus preventing surface hardening. Cases have been noted where steel was decarbonized 0.005 in. in a few minutes in a dirty lead pot. Soft spots may result from lead sticking to the work, especially when double treatment is used, the heavy scale holding the lead, preventing action by the quenching medium.

Preheating is required before inserting work in lead pots, in order to prevent freezing of the lead to the cold surface, and also to keep the temperature more uniform. A good form of equipment is a small preheating furnace heated by the waste gases from the pot furnaces, with a lead pot on each side, one at a temperature slightly below the hardening point, and the other at the exact temperature required. The work is moved at regular intervals from the preheating furnace to the first pot, and from this to the second pot. The most unfavorable feature in using lead is the short life of the ordinary pot.

For drawing operations around 1000 deg. Fahr. requiring great uniformity, the lead pot is very useful. For the sake of uniformity in drawing, different forms of bath are used, the oil bath for temperatures up to 550 deg. Fahr., the nitrate bath, consisting of a mixture of potassium and sodium nitrates, for temperatures up to 900 deg. Fahr., and the lead bath for temperatures up to 1250 deg. Fahr.

Much of the metallurgical work in a factory does not show on the surface, although the elimination of trouble, of course, may bring it out prominently. Under smooth running conditions its results may not be noticed, and it may occasionally seem a waste of time and energy. The fact, nevertheless, remains that the best indication of its proper functioning is the comparative absence of trouble in manufacturing operations which come under its scope.

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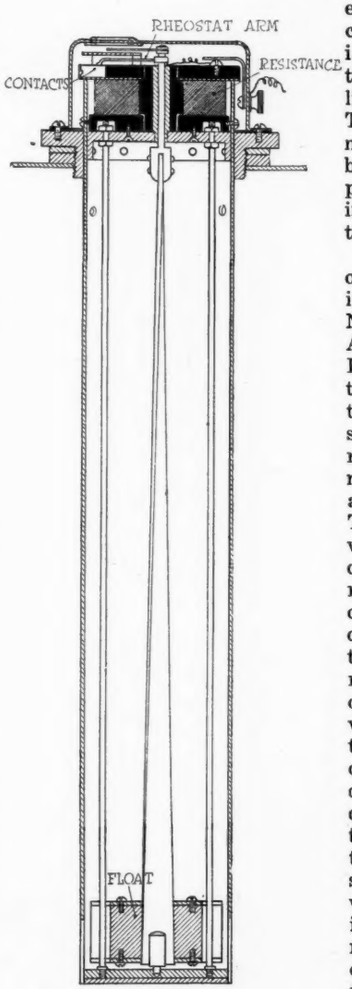
Fuel Gage and Meter Combined

AN invention which is of particular interest is that of a combination electric meter and fluid gage. The object of this invention is to provide in connection with a voltmeter or ammeter an indicating mechanism which also denotes the height of liquid in a tank although the gage itself is some distance from the tank. The arrangement is such that when one button is pressed the electric current is indicated and when another is pressed the height of the liquid in a gasoline container is shown. These separate indicating means can be adapted to be located at different points if desired, such as in the rear of the car, at the tank or on the dash.



Fehrenbach fuel gage and meter

The method of carrying out this invention, which is the subject of patent No. 1,175,417 issued to Alfred, Carl and Reinold Fehrenbach, is shown in the accompanying illustration. The device consists of a rheostat so arranged that it is in connection with the battery and a volt or ammeter. The rheostat is provided with an arm which travels over the contact of the rheostat and cuts out or cuts in resistance in accordance with the direction in which the shaft is rotated by the movement of the float. In other words, the rise or fall of the float cuts in or cuts out the resistance and consequently the amount of current passing through the line in connection with the indicator. A suitable gage scale is used which converts the readings from terms of current to those of gasoline quantities, thus allowing the mounting of a tank level gage on the dash.

The Automobile and Automotive Industries

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Tractor Efficiency

WHATEVER may be the engineering arguments concerning the detail of tractor construction, the efficiency of the tractor as an agricultural machine has been proven by the fact that England has increased her home production of food by 10 per cent solely by the additional cultivation obtained from the use of tractors.

It has been stated many times that the tractor farming in England has been only partially successful; the machines have been constantly in trouble; that their operation has been excessively costly, and that the results have often been disappointing. If, however, the total food output has been raised 10 per cent in one year this must surely give universal satisfaction.

Most of the troubles with the British tractors seem to have been due to lack of intelligent drivers. Operating a tractor is generally accepted as being a real man's job, and apart from direct service in the army there are so many other war occupations of pressing vital necessity in England that it is only here and there an efficient tractor driver has been obtainable. The type of man who knows a little bit about automobiles, but is not generally capable of doing anything really useful of any kind, seems to have been called upon very largely. Boys and women with no technical knowledge have done their best, but naturally it has not been a very good best. Only kerosene has been available for fuel and the tractors which England has had to use have been earlier models than those now on the American market and therefore less adapted for heavy fuel.

A number of tractors which have enabled this 10 per cent increase in British food supply is variously estimated and no accurate figures have been published. Probably there are not more than two to three thousand tractors in the whole country, possibly not so many as this. Presumably statistics will be forthcoming in due course since most of the additional farm work has been handled indirectly by a government department.

Engine Tests in Rarefied Atmospheres

IT is an established principle of all quantity production that before equipment is laid down the article to be manufactured must be thoroughly tried out under service conditions. This principle is being applied both to the Liberty truck engine and to the Liberty aircraft engine. The Model B truck, of which two samples are being built, is to be subjected to a 20,000-mile trial before its regular manufacture will be started upon, and the Liberty aircraft engine is being subjected to various tests in which conditions of operation in aerial warfare will be simulated.

The greatest difference between the conditions under which an aircraft engine works in service and those obtaining in an ordinary block test is due to the rarefied atmosphere and its low temperature at the high altitudes at which many aerial operations are carried out. Battleplanes must be able to rise to an altitude of more than 20,000 ft., at which the atmospheric pressure is little more than one-half as great as at sea level and the average atmospheric temperature about zero Fahrenheit. A service test of an aircraft engine involves difficulties, as accurate observations cannot be taken on an engine while up in the air. The conditions of low pressure and temperature must therefore be reproduced on *terra firma*, where the action of the engine under these conditions can be closely followed. The Liberty motor was first taken for tests to Pike's Peak, Col., and now additional tests are being made in a low-pressure room at the Bureau of Standards, Washington. Probably the Pike's Peak tests were considered inconclusive because that mountain is only little over 14,000 ft. high.

Loss in Power

A low atmospheric pressure of course lowers the power output of the engine. The power probably drops even more rapidly than the pressure, as not only is a smaller amount of fuel burned per cycle, but ignition takes place under much lower compression. The loss in power due to the reduced amount of charge admitted can be partly retrieved by increasing the compression ratio. Assuming that the

ordinary engine has such a compression ratio that when operating under full throttle at sea level it will remain just within the preignition limit, then an increase in the compression ratio would make it impractical to operate the engine at full throttle at low altitudes. Undoubtedly, for a warplane engine performance at high altitudes is of greater importance than performance at low altitudes and provisions to limit the throttle opening while flying at low altitudes could easily be made.

There are other problems in connection with high-altitude operation besides that resulting directly from the levity of the atmosphere. Owing to the very low temperatures carburetion and lubrication involve special difficulties, and these can well be studied in an installation in which the atmospheric conditions at high altitudes are simulated.

Wanted: Better Dealers

PRODUCTION was the manufacturer's problem 10 years ago. Distribution is the manufacturer's problem now. Many men and companies know the secret of turning out 500 cars per day, but few have learned that success endures only on the foundation of a well-organized, finely balanced, Class A dealer and distributer group. And to-day it is conclusively proved that, what with war problems, materials and finance, the manufacturer with the first-class dealer organization wins.

For several months past reports have been current of business difficulties among the small manufacturers of popular-priced cars. The troubles were attributed to varied causes. It was said that small makers of parts were unable to secure materials and could not supply the assembled car makers. Other reports indicated withdrawal of financial credit from parts makers to small companies. Still others were to the effect that parts makers had turned toward war work, neglecting the small car manufacturers and allowing them to meet business disaster. Each of these reports contained truth. Each has been an important factor. But underlying these factors—the real cause for the havoc—is the less capable dealer organization that forms the distributing division of the small maker of low-priced cars.

Many of these dealers are men without considerable financial standing. They are men of lesser business ability. Intelligence, reputation, solidity, and money are not theirs to the fullest measure—which is the reason they could not secure agencies for high-class cars, and the cause of their panic following the declaration of war, with their subsequent business difficulties.

In addition, the intelligent manufacturer of to-day recognizes that the reputation of his dealer or distributer is of vast importance. He knows that he must advertise to maintain the popularity of his product, but that this in itself is no longer sufficient—and that the average buyer first selects a car popularized by advertisements and next because he knows something of the reliability of the dealer with whom he comes into contact.

Those manufacturers build well who give heed to their selection of dealers and distributers, remembering that these men are actually their personal representatives, and that in times of stress, when crucial national and international affairs cause uncertainty, they must be of a caliber that will not falter, pause or weaken.

Another Aero Show to Be Held

IN February last the first American exposition devoted exclusively to aircraft was held in the Grand Central Palace, New York, and proved a gratifying success. That was before the United States entered the war. Since then the course of events has put an entirely different complexion on the aircraft industry. There are certain reasons which would seem to make it inexpedient to hold an aircraft show at this time, while, on the other hand, public interest in the subject of aerial vehicles has increased tremendously and gives much greater warrant for holding a show. Previous to the war there was an aeronautic show in Paris each year for a number of successive years, but with the outbreak of hostilities these shows ceased automatically. Paris is rather too close to the firing line and there are too many restrictions on travel to make it practicable to successfully organize large industrial expositions there at the present time. On the other hand, an aircraft exhibition was recently held in Turin under the auspices of the Italian Government and is said to have been successful in every way.

Can Be Safely Exhibited

There is much aircraft material which can be safely shown at a public exposition. All of the foreign engines manufactured under license in this country have been used on the battlefront for a long time, and samples of them have fallen into the enemy's hands, so that their engineering features are fully known. There is also little in the average primary training plane and its engine which is new and unknown to the enemy's air forces. The Allies have in their possession numerous samples of German and Austrian airplanes, and some of the engines of these planes at least have already been brought to this country. A collection of complete enemy planes and of their engines and fittings would form a most interesting exhibit.

At last year's show there was comparatively little in the way of airplane parts (outside of engines) and accessories, but this was probably because there was no large amount of business in sight. With the Government appropriation of $640,000,000 this is entirely changed, and exhibits of all the different parts and materials used in airplane construction can now be counted on.

As to the benefits to be derived from an aircraft exposition at the present time, from a national standpoint, there are several. The show will afford builders of complete airplanes an opportunity of meeting manufacturers of parts, materials and fittings, and of familiarizing themselves with the products in their line which the market offers. It will also serve as a means of further stimulating public interest in aircraft.

□ Latest News of the

First Army Trucks Completed

Two Class B Vehicles, Finished in a Month, Now on Road to Washington

(A complete illustrated article describing the trucks appears on pages 617, 618, 619 and 620 in this issue.)

WASHINGTON, D. C., Oct. 9—*Special to* AUTOMOTIVE INDUSTRIES—The first heavy duty war truck which the Quartermaster Department has been designing since the first of August has been assembled and started running in Lima, Ohio, yesterday. Another was assembled in Rochester, N. Y., and it was completed and started on the road to-day. Both are type B trucks designed for 3-ton load but with a capacity for 5 tons.

The assembling and the designing sets a new record in American production, the first truck, according to schedule, having to be ready for the road October 10, so that it came through two days ahead of schedule.

Early motor tests showed 58 hp. at 1350 r.p.m., and the engine torque curve has been better than anticipated.

It is now assured that the truck is one of the biggest engineering successes of the war, and that it is destined to revolutionize army truck work so far as standardization is concerned. And that the truck will play a big part in revolutionizing truck design in commercial circles is assured.

That the War Department as well as

(*Continued on page* 656)

—

See New Overland Car

TOLEDO, Oct. 10—*Special to* AUTOMOTIVE INDUSTRIES—Several hundred Overland dealers are visiting the Overland plant to-day and to-morrow to view the new small car which was exclusively announced in AUTOMOTIVE INDUSTRIES last week. Future business policies will be discussed.

—

Parks a Maxwell Director

NEW YORK, Oct. 10—Elton Parks, of Parks & McKinstry, lawyers, was elected a director yesterday of the Maxwell Motor Co., to succeed George H. Burr. The other retiring directors were re-elected.

—

Dorris Adds Capital

ST. LOUIS, Oct. 9—To handle increased production and to carry on a more comprehensive manufacturing program the Dorris Motor Car Co. has increased its capital from $330,000 to $1,000,000. H. B. Krenning, who has been president since the company was organized in 1905, has retired and W. L. Colcord of the Colcord-Wright Machine Co. of this city has succeeded him. G. P. Dorris, vice-president and engineer, continues in this dual capacity. H. Leathers, a new man in the company is treasurer.

—

De Lisser to Build Factories in France

NEW YORK, Oct. 6—Horace de Lisser, chairman of the board of directors of the Ajax Rubber Co., and also chairman of the automobile and allied trades committee of the second Liberty Loan Committee, will soon leave for France to serve on General Pershing's Business Men's Staff with rank of major. His duties, with other members of the staff, will be to construct 15 miles of factories behind the fighting lines. These plants will furnish the army with such field equipment as cannot be brought from London and Paris or imported from neutral countries.

—

Now Lieutenant Vail

WASHINGTON, D. C., Oct. 9—E. L. Vail has been temporarily released from charge of the automobile department of the Waltham Watch Co., Waltham, Mass., and has received a commission of First Lieutenant in the Aviation Section of the Army and has been assigned for duty in the Airplane Engineering Section. Frank T. Day, who has been in the merchandising end of the Waltham Co., has taken up Lieutenant Vail's work.

—

Cutler Made Chief of Foreign Commerce Bureau

WASHINGTON, Oct. 5—The appointment of Burwell S. Cutler, of Buffalo, as chief of the Bureau of Foreign and Domestic Commerce, Department of Commerce, was confirmed by the Senate to-day. He has been first assistant chief, but since the resignation of Dr. E. E. Pratt has been acting chief.

—

Monell in Aviation Service

WASHINGTON, Oct. 10—Ambrose Monell, president of the International Nickel Co., has been commissioned a Colonel on the staff of the commander of the American Aviation forces abroad. He has resigned the presidency of the International company. Monell plans to reach France in about six weeks.

—

Pan-American Aero Show Feb. 16-23

NEW YORK, Oct. 10—The second Pan-American aeronautic exposition is to be held at the Grand Central Palace Feb. 16 to 23.

460,639,407 Barrels Petroleum in 1916

300,767,158 Produced by United States—Russia Next With 72,801,110

WASHINGTON, Oct. 8—The world production of petroleum in 1916 was 460,639,407 barrels of 42 gal., of which the United States produced 300,767,158 bbl., or 65.29 per cent. The nearest approach to the United States as an oil producer is Russia, which in 1916 produced 72,801,110 bbl., or 15.81 per cent of the world's production. These facts have been brought out in a table prepared under the direction of J. D. Northrop, of the United States Geological Survey, showing the world's production of crude petroleum in 1916 and since 1857, according to countries. The table follows:

(*Continued on page* 652)

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White a Cadillac Vice-President

DETROIT, Oct. 6—D. McCall White, chief engineer of the Cadillac Motor Car Co., has been made vice-president in charge of all manufacturing plants. W. A. Blackburn has become manager of manufacturing. H. Lineberg is manager of production, and W. E. McKechnie manager of building and maintenance.

Mr. White's former training and experience in locomotive building, marine engineering and in general engineering work, have admirably fitted Mr. White for his first post of chief engineer of the Cadillac company. Previous to joining the Cadillac company he was manager of the Crossley Motor of England, builder of Crossley cars. He designed the first silent Knight automobile built in England and also the Cadillac eight. He was at one time assistant engineer of the Daimler Motor Car Co., Coventry, England, and some time later was made chief engineer of the De Luca-Daimler Motor Co., Naples, Italy, from which position he was advanced to the position of manager.

—

Army Trucks to Reach Washington Saturday

ROCHESTER, Oct. 10—*Special Telegram to* AUTOMOTIVE INDUSTRIES—Both the new Class B military trucks are on their way to Washington. The route will take one of them from Lima, Ohio, through Pittsburgh and Harrisburg, and the other from Rochester through Elmira, Williamsport and Harrisburg. From there both will go over the same route to Washington and should arrive Saturday.

Automotive Industries

Plan Big Boost in S. A. E. Members

Drive Started to More Than Double Membership—Take in Business Heads

WASHINGTON, D. C., Oct. 8—The present membership of 3000 in the Society of Automotive Engineers is to be boosted to 5000 and it may be 8000 in the next 18 months or 2 years, according to plans decided upon to-day at the monthly meeting of the Council held in the Washington office in the Munsey Building.

A new position on the office staff of the S. A. E. was created to handle membership matters, so that the entire office organization will now be back of the membership drives to be made this year. The person to fill this position has not yet been selected.

A still further membership activity was discussed here to-night at a special dinner of the S. A. E. councilors and members, among the latter being Howard E. Coffin, of the Advisory Commission of the Council of National Defense. The new plan is to add to the membership roll the business heads of the majority of companies engaged in making automobile apparatus and parts and accessories for same.

The present war has tied engineering, manufacture and business management so closely together that the work of the S. A. E. would be greatly strengthened by adding perhaps 1000 or more names of such business managers, presidents, financial men, etc.

Christian Girl of the Standard Parts Co., Cleveland, Ohio, and who is directing the production activities of the war truck for the Government, was the leading exponent for this extension of membership. He believes that the potency of the society can be greatly increased by increased membership and by greater interest of the financial and business heads of our industry.

The Council voted to change the name of the chain division of the standards committee to the Roller Chain Division and appointed John R. Cantley as chairman.

Chairman David Beecroft, of the 1917 Meetings Committee, reported that arrangements have been completed for the Winter Meetings in New York and Chicago during automobile show weeks. The War Dinners, to be held in New York Jan. 10 and Chicago Feb. 1, are already assured successes. Already two leading Government officials have agreed to speak and some others of international character are scheduled. The programs for the New York and Chicago professional sessions are practically complete. The Chicago meeting will largely be devoted to farm tractor design, and the New York meeting will deal extensively with the aviation and motor truck war problems.

—

Redden Enters Tractor Field—Truck Attachment in New Hands

NEW YORK, Oct. 8—C. F. Redden, president and founder of the Redden Motor Truck Co., has sold out his entire holdings and interests in the company and has resigned from the presidency of that company to enter the farm tractor field.

Mr. Redden started manufacturing attachments for converting passenger cars into trucks over 2 years ago. Last January, he succeeded in interesting large manufacturing and financial interests in Chicago to enter into the manufacture of his truck maker on a big scale.

The Redden Motor Truck and the Commercial Car Unit, manufacturing the Truckstun unit for Fords in Philadelphia, have combined to form a new organization capitalized at $1,000,000. The Cook, Lacoin and Scott patents are also combined. Redden units for the present will be made in the Jackson plant and Commercial car units in Philadelphia.

—

Washington Post for Editor

DETROIT, Oct. 9—Allen Sinsheimer, Detroit news editor of AUTOMOTIVE INDUSTRIES has been called to Washington to co-operate with Christian Girl in the production department of the United States army.

—

Tracy in Government Work

INDIANAPOLIS, IND., Oct. 9—E. W. Tracy of the Premier Motor Corp. has joined the production department of the United States army under Christian Girl. Mr. Tracy was formerly director of purchases.

—

Army Post for Morgan

INDIANAPOLIS, IND., Oct. 9—Guy W. Morgan has joined Christian Girl in the truck department of the United States army at Washington. Mr. Morgan was formerly president of the Abbott Corp.

—

Aviation Division Meeting Oct. 28

NEW YORK, Oct. 10—Another meeting of the aircraft division of the S. A. E. Standards Committee will be held at the Bureau of Standards, Washington, on Sunday and Monday, Oct. 28-29. On Oct. 28, standards having to do with the engine and its accessories will be discussed, and on Oct. 29 standards relating to the fuselage and wings.

Future Business Uncertain

Markets Unsettled—Conditions Confusing—Unprecedented Prosperity

DETROIT, Oct. 8—How will business be during the next 6 months? This is the question in the mind of every automobile and parts maker, and it is one that none will attempt to answer definitely. Unusual conditions tend to create the doubtful situation, and with the existing problems differing radically from those of the past, prophecies become unsafe and impossible.

In the face of the declining market produced by the season of the year, practically all makers are increasing prices. Added to this is the new war tax, the results of which no one now knows or can attempt to predict. Many makers urge that the farmers will be exceedingly prosperous during the coming 6 months and will be heavy car buyers, while others point out that farmers are never buyers of cars during the winter months. Materials continue to increase in price and many are very difficult to secure. Labor is at a premium and wages, which advanced 20 per cent in the last 6 months, appear to be headed for continual increase of even higher proportions. The Liberty Loan is thought by many to be certain to create a temporary depression in business because of the money, now in circulation, which will be taken for payments. This it is pointed out will be only temporary because the Government will make expenditures that will balance the situation. On the other hand mines, farms, factories and distributors throughout the country are working at full capacity. Railroads carry more freight and passengers than ever before. Prices for crops, and bumper crops are greater than in the past. Every plant seeks workers and wages are being distributed in record breaking amounts in every section of the country. Exports are improving. Banks report increased deposits. On all sides are evidences of prosperity which when contrasted with the season, war, bond issue, scarcity of materials and workmen, and the new tax leave all opinion as to the future uncertain and doubtful.

One group of car makers including Ford, Overland, Buick, Maxwell, Chevrolet, Dodge, Oakland and Olds are enjoying record-breaking business. Each plans a winter production schedule in excess of the 1916-1917 output. Each is visited by dealers beseeching shipments

(*Continued on page* 655)

20,000 War Planes Now Building

Practically Entire Number Appropriated for in War Bill Under Construction

WASHINGTON, Oct. 8—Practically the total number of 20,000 airplanes for the United States Army provided for in the $640,000,000 aviation bill passed by Congress in July is now under construction, contracts having been let and work started on both planes and motors. The types of planes now being manufactured, and in which the Liberty motor will be installed, include the entire range of training machines, light high-speed fighting machines and powerful battle and bombing planes of the heaviest design.

This statement is authorized by Secretary of War Baker, who says the giant battle planes contracted for are capable of the work of the Caproni, the Handley-Page and similar types.

—

Airplane Plant for Sacramento

SACRAMENTO, CAL., Oct. 8—An airplane factory for the manufacture of airplanes will be located in this city at the Globe Iron Works. J. M. Henderson, Jr., and associates have been granted a contract for $18,000,000 worth of planes to be furnished within the next 12 months and thirty of the machines are to be delivered before Nov. 1. It is expected that 2000 workers will be employed with a monthly payroll of $160,000. The contract calls for the delivery of five planes per day.

—

Big Production for Curtiss by Jan. 1

NEW YORK, Oct. 8—A monthly production of $12,000,000 worth of airplanes and parts is expected by the Curtiss Aeroplane & Motor Corp. by Jan. 1 next. This is at the annual rate of $150,000,000, and does not include any orders for Liberty motors, but only its regular business.

The company is winding up a large order for airplanes placed by the British Government about a year ago. The order for flying boats for Great Britain will not be finished before the early part of next year. A satisfactory arrangement has been reached whereby the Curtiss company will continue its British business.

—

C. A. C. Run Is Canceled

CHICAGO, Oct. 6—The Chicago Automobile Club has canceled its annual event known as the master drivers' run to aid the Liberty loan campaign. When the drivers and officials in charge of the run met at the club to make the final arrangement, enthusiasm for the second loan campaign caused a radical change. Instead of a three-day contest, which was to have been engaged in Oct. 11, 12 and 13, the cars of the master drivers and others of the club will be placed at the disposal of the Liberty loan committee of Chicago, together with the services of the individuals. In addition, all will help the salesmen wherever they can in tabulating and checking over their lists.

—

Peerless to Make Airplane Parts

CLEVELAND, Oct. 8—The Peerless Motor Car Co. is reported to be earning at the rate of $200,000 monthly and has increased its production capacity 50 per cent. The progress of the passenger car business has been fair but necessarily curtailed by the huge demand for Peerless trucks for government work. It is reported that the Peerless company will soon commence the manufacture of airplane parts.

—

Kelly Field Nearly Finished

SAN ANTONIO, TEX., Oct. 9—Kelly field, an aviation training ground near here, is rapidly being finished. The Government is spending $4,000,000 for buildings and improvements, making it the largest government flying ground in the United States.

According to plans, those training here will be divided into squadrons, each to consist of 154 enlisted men and nineteen commissioned officers. To each squadron there will be assigned twelve airplanes. Each squadron also has twenty-three motor trucks, twenty-four trailers, one automobile, two repair trucks and six motorcycles. There are also twelve machine guns, 154 rifles and 173 pistols to each squadron.

One of the important features of this camp is the machine shop, where the airplanes are not only repaired, but are being rapidly constructed.

An examining board meets regularly to examine applicants. Students are sent here from the ground schools which have been opened in many places throughout the country. The ground school nearest to San Antonio is that at Austin.

—

8986 Overlands Shipped in September

DETROIT, Oct. 9—The Willys-Overland Co., Toledo, shipped 8986 cars in September, sold at wholesale 6458 and at retail 7928, and during the ten-weeks Sales Congress Contest, which closed August 22, it sold 47,212 cars at a retail value of $39,237,250.

—

S. A. E. Section Dates Announced

NEW YORK, Oct. 9—Dates for the Society of Automotive Engineers section meetings this month have been announced as follows:

Oct. 10—Buffalo Engineering Section. Speaker, G. W. Dunham on "Automotive Engineering in War."
Oct. 18—Metropolitan Section. Subject, "Aeronautics."
Oct. 18—Detroit Section. Subject, "Laboratory Tests."
Oct. 19—Cleveland Section.
Oct. 25—Pennsylvania Section. Subject, "Springs," by W. C. Keys.

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Houdaille Shock Absorbers on Cunningham

NEW YORK, Oct. 5—Houdaille shock absorbers will be standard equipment on Cunningham cars for 1918.

Purchasing Agents in Convention

National Body, Meeting in Pittsburgh, Standardizes Catalog Page Size

PITTSBURGH, PA., Oct. 9—The annual convention of the National Association of Purchasing Agents opened here to-day with an attendance of 400. The membership has grown from 200 to 500 during the year. A year ago there were branches in New York, Columbus and Pittsburgh, to-day there are in addition branches in Baltimore, Detroit, Los Angeles and South Bend. Plans are under way to greatly widen the scope of the association.

The association adopted a standard catalog sheet size of 8½ by 11 in. and is determined to meet the demand for standardization in this and other matters by actively pushing its campaign. The convention has two days more to run and may already be said to have ushered in a new era of co-operation among buyers.

To-day's speeches were principally concerned with the addresses of welcome by Robert Garland of the Pittsburgh Chamber of Commerce and the Garland Nut & Rivet Co. and E. L. McGrew of the Standard Underground Cable Co. W. L. Chandler of the Dodge Mfg. Co. spoke on the standardization of catalogs and was the father of the resolution adopting the standard sheet.

Automotive Industry Represented

The automotive industry was strongly represented in a delegation of 25 who came down from Detroit and a movement to bring the 1918 convention to the motor city has already gained a strong footing.

Other matters of importance on the program are: "Policy in Buying," by W. G. Langford of Westinghouse, Church, Kerr & Co., New York; "Cash Discounts as Viewed by the Purchasing Agent," by F. A. Marsh of the Link-Belt Co., Chicago; "Relations Between Traffic and Purchasing Departments," by H. E. Harmon of the Pittsburgh-Des Moines Co., Pittsburgh; "Co-operation between Salesmen and Purchasing Agents," by N. O. Aeby of the Jeffery Mfg. Co., Columbus, Ohio; and "The Future Welfare of Our Association," by E. L. McGrew, president of the National Association of Purchasing Agents. Arrangements have also been made for visits to the plants of the H. J. Heinz Co. and the Westinghouse Electric & Mfg. Co.

—

Rubber Products Moves

NEW YORK, Oct. 9—The Rubber Products Co., of Barberton, Ohio, manufacturer of Stronghold tires and tubes, has removed its New York branch from 148 West Sixty-eighth Street to 243 West Fifty-fifth Street. James H. Riley, who formerly represented the company in the New England territory, is now manager of the New York branch.

Little Selling in Motor Shares

Passing of Dividends Has Been Discounted—Few Gains Expected

NEW YORK, Oct. 10—The automotive and allied trades stock market is a peculiar one at the present time. Reports of record earnings, of big business in certain lines, has not been favorably received by the stock buying public. That has been the main reason for the general decline in these shares. Now that the four taxes have been passed on to the public, and the sale of more Liberty bonds have been announced, selling of motor shares seems to have ceased. Many believe that the automobile industry is in for a rebound. The passing of dividends by the Saxon and Maxwell companies seems to have been discounted. The statement of the U. S. Rubber Co. to its holders, was one of worthy attention to the bears. But as stated, market in these shares is a peculiar one, and this is borne out by a perusal of the accompanying list showing last week's activities. Tire issues were the weakest stocks in that market. Goodyear dropped 13 points, Firestone, 6 points, and Miller 5 points. Losses in the automobile issues last week were small.

Elgin Scout Finishes Long Trip

CHICAGO, Oct. 9—The Elgin Six Scout to-day finished its 6000 mile trip to Los Angeles and back with the official A. A. A. seals on the hood, transmission and clutch unbroken. The car kept to its schedule from the time of its start Aug. 4 until the finish. The engine was found in perfect running order and the clutch and transmission were in good condition.

Republic and Knight Tire Merge

YOUNGSTOWN, OHIO, Oct. 10—The Republic Rubber Co., which last July acquired an option on the controlling interest of the Knight Tire & Rubber Co., has finished its plans in regard thereto by the formation of a $10,000,000 company to be styled Republic Rubber Corp. Guy E. Norwood is president of the new corporation.

Better Oil for U. S. War Planes

WASHINGTON, Oct. 10—A new lubricating oil which it is hoped will appreciably prolong the life of airplane and automobile engines, is now being tested by the Council of National Defense. It has already been approved by war experts. Though the composition is unknown, it is stated that it is not a new product but is a scientifically refined modification of common lubricating oils.

Burnett Joins S. A. E.

NEW YORK Oct. 4—Robert S. Burnett has become assistant to M. W. Hanks in the standardization work of the Society of Automotive Engineers. Mr. Burnett was in the engineering department of the Bijur Motor Lighting Co., Hoboken, N. J., before joining the association.

Canadian Ford Has $2,066,455 Cash

FORD, ONT., Oct. 6—The Ford Motor Co. of Canada, Ltd., in its balance sheet for the year ending July 31, 1917, shows cash in hand of $2,066,455.93 and assets of $12,510,130.72. The surplus amounts to $3,380,582.53.

Steam Trucks To Help Traffic

Coke-Burning Vehicles in London to Handle Short Hauls

LONDON, ENG., Sept. 1—This city not having the large terminal facilities for handling railroad freight which are found in major American cities, is experiencing traffic congestion which would not be experienced in other but war times. There are some other cities, notably Liverpool, in a similar condition. In order to lessen this congestion in the London district it is being considered to commandeer all steam motor trucks except those engaged specifically in Government work. Trucks of this nature are unknown in America, but they are generally of 3 and 5-ton load capacity, burn coke, and their fuel and maintenance cost are considerably less per ton-mile than gasoline trucks.

Estimates suggest that 2000 or 3000 of these trucks can be obtained for the handling of freight over short distances in the London zone, thereby freeing railroads from the necessity of using their cars for hauls of 20 or 30 miles from the city.

McKinnon to Make Cars

ST. CATHARINE, ONT., Oct. 9—The McKinnon Industries, Ltd., has incorporated here for $1,000,000. This company was formerly the McKinnon Chain Co., manufacturing chains and accessories, and under the new capital will manufacture automobiles, bicycles and accessories.

Automobile Securities Quotations on the New York and Detroit Exchanges

	Bid	Asked	Net Ch'ge
*Ajax Rubber Co	59	62	+1
*J. I. Case T. M. Co. pfd	80	82	..
Chalmers Motor Co. com	2	5	..
Chalmers Motor Co. pfd	..	..	..
*Chandler Motor Co	72	76½	—1
Chevrolet Motor Co	76	79	—1
Curtiss Aeroplane	30	37½	+1½
*Fisher Body Corp. com	25	35	..
*Fished Body Corp. pfd	86	87½	+2
Fisk Rubber Co. com	60	65	—3
Fisk Rubber Co. 1st pfd	102	105	..
Fisk Rubber Co. 2nd pfd	90	95	..
Firestone Tire & Rubber Co. com	106	110	—6
Firestone Tire & Rubber Co. pfd	100	103	—1
*General Motors Co. com	94¼	94¾	—1
*General Motors Co. pfd	77¼	78¾	+4¼
*B. F. Goodrich Co. com	42½	44	— ⅜
*B. F. Goodrich Co. pfd	100	103	..
Goodyear Tire & Rubber Co. com	174	176	—13
Goodyear Tire & Rubber Co. pfd	100	102	—1
Grant Motor Car Corp	2	4	..
Hupp Motor Car Corp. com	2½	3½	..
Hupp Motor Car Corp. pfd	82	88	..
International Motor Co. com	8	12	..
International Motor Co. 1st pfd	20	40	..
International Motor Co. 2nd pfd	15	30	..
*Kelly-Springfield Tire Co. com	41	43	—1½
*Kelly-Springfield Tire Co. 1st pfd	85	90⅛	..
*Lee Rubber & Tire Corp	17	18	— ¾
*Maxwell Motor Co., Inc. com	32⅝	34½	+ ⅛
*Maxwell Motor Co., Inc. 1st pfd	65	67	+1
*Maxwell Motor Co., Inc. 2nd pfd	19¼	20	—1½
Miller Rubber Co. com	170	175	—5
Miller Rubber Co. pfd	100	102	..
Packard Motor Car Co. com	143	148	..
Packard Motor Car Co. pfd	94	98	..
Paige-Detroit Motor Car Co	23	25	..
Peerless Truck & Motor Corp	7	13	—3
Portage Rubber Co. com	122	125	—1
Regal Motor Car Co. pfd	15	20	..
Reo Motor Car Co	24	25¼	—1
*Saxon Motor Car Corp	12	13	..
Springfield Body Corp. com	..	..	..
Springfield Body Corp. pfd	..	..	..
Standard Motor Construction Co	9	10	..
*Stewart-Warner Speed. Corp	62½	63½	—1¼
*Studebaker Corp. com	33½	34½	—10¾
*Studebaker Corp. pfd	..	90	..
Swinehart Tire & Rubber Co	40	45	..
Submarine Boat	16⅜	16	— ⅛
United Motors Corp	21½	22	—1⅞
*U. S. Rubber Co. com	57¼	58	—1¼
*U. S. Rubber Co. pfd	101½	102	—1½
*White Motor Co	41	42	—2
*Willys-Overland Co. com	24⅞	25	— ⅝
*Willys-Overland Co. pfd	87¼	94	— ¾
Wright-Martin	10⅜	9¾	+1¾

*At close October 8, 1917. Listed New York Stock Exchange.

OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE

ACTIVE STOCKS

	Bid	Asked	Net Ch'ge
Auto Body Co	..	10¼	..
Bower Roller Bearing Co	28⅛	30½	— ⅜
Chevrolet Motor Co	77	81	..
Commerce Motor Car Co	..	8½	..
Continental Motor Co. com	6	6½	— ⅜
Continental Motor Co. pfd	..	..	..
Edmunds & Jones com	..	40	..
Ford Motor Co. of Canada	212	220	—2
Hall Lamp Co	..	21	..
Michigan Stamping Co. com	12½	..	..
Motor Products	..	..	..
Packard Motor Car Co. com	..	..	..
Packard Motor Car Co. pfd	..	96½	..
Paige-Detroit Motor Car Co	24	24⅜	..
Prudden Wheel Co	..	18½	..
Reo Motor Car Co	24	24⅜	—1¾

INACTIVE STOCKS

Atlas Drop Forge	..	33½	..
Kelsey Wheel Co	82	..	..
Regal Motor Car Co	..	26½	..

Exports Drop 28 1-2 Per Cent

Lack of Shipping Space and Embargoes Responsible for Decline

Mos.	Cars	Value	Trucks	Value	Parts
		1917			
Aug.	3697	$3,283,354	838	$2,289,307	$2,415,554
July	5081	3,621,539	1386	3,561,583	2,139,938
		1916			
Aug.	5254	3,574,485	1565	4,442,158	2,051,895

WASHINGTON, Oct. 10—A drop of 25 per cent in passenger car and 32 per cent in truck exports from the United States occurred in August. Passenger car exports from this country in that month numbered 3697 valued at $3,283,354, compared with 5081 in July, valued at $3,621,539. Truck exports numbered only 838, valued at $2,289,307, compared with 1386 in July, valued at $3,561,583. The decline averaged 28½ per cent.

August shipments abroad are far below the 1916 figures for the same month when 5254 cars and 1565 trucks were exported. Lack of shipping space and embargoes have been responsible for the decline. The demand for our cars and trucks in neutral countries is above normal, but it is practically impossible for shipments to get in to their ports. South American countries and Canada, on the other hand, have been our biggest buyers, and our sales to these countries have been fair.

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All-Season Body Stock Offer

MARSHALL, MICH., Oct. 9—The All-Season Body Co. is offering its stock to the public at $7 per share. The stock has a par value of $10.

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United Publishers Corp. in Big Real Estate Deal

NEW YORK, Oct. 8—THE AUTOMOBILE AND AUTOMOTIVE INDUSTRIES has figured in one of the largest real estate deals ever recorded in connection with the business and technical press publication. The present home of THE AUTOMOBILE AND AUTOMOTIVE INDUSTRIES at 239 West Thirty-ninth Street has been purchased by the United Publishers Corp., publisher of over twenty business, technical, trade, engineering and merchandising papers, such as THE AUTOMOBILE AND AUTOMOTIVE INDUSTRIES, *Motor World, Motor Age, The Commercial Vehicle, El Automobile Americano, Transfer and Storage* in the automobile line, and such other papers as *Iron Age, Hardware Age, Dry Goods Economist, American Architect,* etc.

The property figuring in the deal is an eleven story building at 239 West Thirty-ninth Street, New York, which building has been largely occupied by the United Publishers Corp. for many years.

The entire building has been secured by the U. P. C., as the holding company is generally known, and will be used exclusively by its several properties.

The building measures 195 ft. street frontage, with 90 ft. depth. The property is valued at $1,300,000 in the transaction. THE AUTOMOBILE AND AUTOMOTIVE INDUSTRIES could not have a more centrally located home in New York. The building is in the up-town district and is located approximately midway between the two great depots in the city, the Grand Central and the Pennsylvania. The first floor of the building is entirely occupied by the Times Square station of the New York Post Office. Three floors and the basement are occupied by the Federal Printing Co., which is the printing organization of the U. P. C., and four other floors are occupied by the publishing offices of the U. P. C. itself.

AUTOMOTIVE INDUSTRIES *is on the sixth floor of the U. P. C. Building. There is a post office on the street floor. The basement and three floors are used by the printing and binding plant. Papers are edited, printed, bound, addressed, wrapped and shot right into the mail trucks in one progressive operation*

Exports of Automobiles, Trucks and Parts for August and Seven Previous Months

	August				Seven Previous Months			
	1916		1917		1916		1917	
	No.	Value	No.	Value	No.	Value	No.	Value
Passenger cars	5,254	$3,574,485	3,697	$3,283,354	43,661	$29,472,228	44,815	$34,029,185
Commercial cars	1,565	4,442,158	838	2,289,307	12,938	35,167,840	9,410	22,909,383
Parts, not including engines and tires	.....	2,051,895	.....	2,415,554	.....	15,227,161	.....	19,408,708
	6,819	$10,068,538	4,535	$7,988,215	56,599	$79,867,229	54,225	$76,347,276
			BY COUNTRIES					
	1917 Passenger Cars		1917 Commercial Cars		1917 Passenger Cars		1917 Commercial Cars	
Denmark	.....	.....	.....	.....	247	$223,616	.....	.....
France	70	$27,508	121	$345,109	1,095	562,295	1,798	$4,878,781
Norway	32	23,515	.....	.....	659	695,933	.....	.....
Russia in Europe	86	379,856	.....	.....	254	598,301	322	819,325
United Kingdom	45	70,093	490	1,561,014	895	993,639	5,138	13,656,862
Canada	892	670,870	75	116,970	12,645	9,560,929	554	752,934
Cuba	401	309,749	.....	.....	1,704	1,476,059	.....	.....
Argentina	145	125,198	.....	.....	2,210	1,472,537	.....	.....
Chile	261	227,555	.....	.....	2,291	1,715,126	.....	.....
British India	.....	.....	.....	.....	1,495	1,153,527	.....	.....
Dutch East Indies	295	292,744	.....	.....	1,542	1,496,478	.....	.....
Russia in Asia	4	6,700	.....	.....	259	417,738	193	622,883
Australia	11	12,253	.....	.....	2,692	2,077,192	.....	.....
New Zealand	28	27,145	.....	.....	1,885	1,378,658	.....	.....
Philippine Islands	121	109,470	.....	.....	767	568,646	.....	.....
British South Africa	335	259,156	.....	.....	2,554	1,829,111	.....	.....
Other Countries	971	743,542	152	266,214	11,621	7,809,400	1,405	2,178,598
	3,697	3,285,354	838	$2,289,307	44,815	$34,029,185	9,410	$22,909,383

Creditors Operate Smith Truck

Financial Difficulties of Form-A-Tractor and Truck Corp. Temporarily Fixed

CHICAGO, Oct. 7—Upon application of creditors having claims totaling $100,000, the Smith Form-A-Tractor Co. yesterday was placed in the hands of the Central Trust Co. as receiver. Yesterday also creditors of the Smith Motor Truck Corp., a distinct concern, manufacturing the Smith Form-A-Truck, agreed to withhold their claims against the Smith Motor Truck Corp. for at least 6 months.

The Smith Motor Truck Corp. is to be operated by a creditors' committee. Its assets, according to President D. W. Figgis, are $1,634,786 in excess of the liabilities, which amount to $1,700,000.

Holders of large claims against the two concerns believe that financial difficulties of both have been settled at least for the present. Seemingly these had reached a critical point, as indicated by a suit filed against both companies in the Federal District Court by the Perfex Radiator Co. of Racine, the amount named being $12,500. The officials of the Form-A-Tractor company agreed to the receivership, but insisted that the firm was solvent. Its liabilities are estimated at $150,000, with assets $35,000 in excess.

Heavy purchases of supplies and a sudden drop in sales are given as the reason for the troubles of both concerns. Operation of the Smith Motor Truck Corp. is to be by a committee of six, all creditors of the truck company. They are: David R. Forgan, W. R. Dawes, O. J. Feehling, Prentiss L. Coonley, all of Chicago; C. E. Danforth, of New York, and P. A. Conley, of Cleveland. This committee will wait upon the other creditors, who represent less than 25 per cent of the company's indebtedness, and will submit plans to operate the company, which the committee feels sure will be agreeable to them, and to which the truck company's management has agreed.

An agreement will be drawn between the officers of the company and the creditors in which the company is to give all the creditors notes carrying a rate of 6 per cent interest, payable 6 months from date. At the end of 6 months, if the company so desires, it is to have the right to extend the notes on 80 per cent of its indebtedness for a further period of time, to be decided upon later.

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Olympian Brings Out Closed Bodies

PONTIAC, Oct. 8—The Olympian Motors Co. is bringing out three styles of closed cars, including a sedan, Springfield type, coupe and winter detachable top. The Olympian company has given special attention to finish, trimmings and upholstery. The doors on all models are wide and the cars are roomy.

Last picture taken of Mr. Houk. It was made on his California ranch recently

Supreme Will Make Automobile and Airplane Motors

INDIANAPOLIS, IND., Oct. 6—The Supreme Motors Co., Cleveland, O., will move its headquarters to Fort Wayne, Ind., where a manufacturing plant for temporary use is to be leased within a few days. The company has a capitalization of $1,000,000, and is to engage in the manufacture of automobile, airplane and tractor motors. The company has announced plans also for placing a light passenger car on the market in the near future.

Clarence F. Jamison, of Lafayette, Ind., formerly assistant general manager of the Elgin Motor Corp., Chicago, is president of the company; Benjamin F. Cline, formerly with the Elgin company, is vice-president; Courtney M. Mitchell, Cleveland, is chief engineer; C. E. Manning will be experimental engineer, and U. P. DeHart, of Cleveland, is purchasing agent.

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Compound Adds to Gasoline Efficiency

CLEVELAND, Oct. 8—The Inter-Lube Chemical Co. of Delaware has been formed to manufacture a secret compound which is said to add 25 per cent to the efficiency of gasoline when used in an internal combustion engine. It is stated that the French government is using this compound.

H. J. Mayers, president of the Mutual Motor Stores Co., has been elected president of the new concern, which is capitalized for $1,000,000 and which takes over the old Inter-Lube Chemical Co., Cleveland.

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D. V. Kennedy, who has been representing the Perfex Radiator Co., Racine, Wis., in the Detroit territory, has been transferred to the headquarters office in Racine and will devote his attention mainly to the tractor trade.

George W. Houk Dead

Wire Wheel Pioneer Succumbs in Los Angeles to Pneumonia at Age of 52

LOS ANGELES, Oct. 8—George W. Houk, one of the pioneers of the wire wheel business in America, died in this city last week of pneumonia. He was 52 years old. He came to this section in May and went to his ranch near this city for a needed rest. His condition improved and a complete recovery was hoped for, but paralysis of the right side developed and bronchial complications were followed by pneumonia, which proved fatal. He is survived by a daughter, Margaret, who was with him throughout his stay here. She is Mrs. F. H. Moody. Her husband is manager of the Houk business in California.

Houk spent his boyhood in Wellsboro, Pa., and in early life entered the bicycle trade. After several years in New York he went to London and spent 15 years there in the bicycle and accessories business. He then returned to America and was connected with the Packard and Oldsmobile businesses in Boston, having the agency for the latter.

About 5 years ago he brought the Rudge-Whitworth wheel to America from England and had it manufactured for him by the Standard Roller Bearing Co., of Philadelphia. Later he bought the McCue plant in Buffalo and operated as the Houk Mfg. Co., making and selling wire wheels of his own manufacture. The business prospered and to Houk is given much credit for the development of the wire wheel industry in America, he having single-handed fought a long hard fight from the time he introduced the first wheel until his business reached its present proportions.

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PRICE CHANGES

NEW YORK, Oct. 6—The following companies have increased their prices in the past 2 weeks:

Car	Old Price	New Price
Elgin	$985	$1,095
Empire 70A	1,285	1,345
Empire 71	1,285	1,345
F.R.P.	6,000	7,000
Jackson	1,395	1,495
Jordan	1,795	1,995
Lexington	1,510	1,585
Marmon	3,050	3,550
Monitor C & R	895	995
Monitor N & O	1,095	1,195
Olympian	845	965
Peerless	2,090	2,340
Reo R	875	985
Reo M	1,250	1,385

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Michigan Licenses 60,000 More Than 1916

LANSING, MICH., Oct. 5—There were 220,770 licensed motor vehicles in the State of Michigan on Oct. 1, which is 60,000 more licenses than were issued for the entire year of 1916.

Industrial Review of the Week

A Summary of Major Developments in Other Fields

Transport Problem of the Cantonments

Approximately 2500 carloads of food and other necessities are being delivered daily by the railroads at the cantonments where the new National Army and the National Guard are being trained for service abroad, according to reports just received by the Railroads' War Board. Accurate figures as to the extent to which the supplying of food and necessities for the soldiers at the training camps will intensify the transportation problem will not be available until all of the camps have received their full quota of men.

The task which the railroads have been asked to perform, however, is a difficult one. It involves the supplying of all the necessities of life for sixteen non-productive cities of a population of 40,000 each and fifty-six smaller cities ranging in population from 300 to 3000. Altogether, more than a million men gathered at the various cantonments must have their daily necessities brought to them by the railroads. As it takes at least five pounds of food per day for each soldier, in addition to the food, clothing, fuel and other supplies that are constantly needed, the railroads have their work cut out for them.

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A Plea for More Research Work

The chief event of the week in the electrical field was the annual meeting of the American Institute of Electrical Engineers, which was held in Philadelphia. It was attended by 300 members, representing all branches of the industry and every part of the country. One of the chief topics of discussion was research. It was pointed out that in order that our industries may retain their lead in international competition much more research work must be done. There is a great demand for men capable of undertaking successful research work, but the supply of such men is small. The consensus of opinion seemed to be that the universities should be urged to give more attention to this subject, not only in undertaking research work on their own account, but in training men to fit them for research work for private corporations.—*Electrical World.*

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Higher Coal Prices Expected

The movement of bituminous coal still continues to be almost entirely a matter of contract obligations entered into before price fixation by the Government. Many such contracts have not yet been filled and have a considerable time yet to run. As a consequence, some firms holding these agreements are now enabled to accumulate more or less sizable stocks, and, in some instances, firms thus stocking coal are having difficulty in preventing spontaneous combustion in the stockpiles. The failure of the coal administration to adjust bituminous prices upward on or about Oct. 1 has occasioned some chagrin and no little surprise among coal producers and dealers generally. Particularly since the fixing of the coke price at $6 it has been anticipated that prices of bituminous coal would shortly be changed in an upward direction. It is still thought that the Government cannot much longer continue to disregard the handwriting on the wall, and that prices must shortly be established sufficiently high to stimulate production to its maximum. Consequently, now, as during the past few weeks, the eyes of coal men are focused on Washington. The present situation is indeed serious and it is rumored in certain quarters that it is the deliberate intention of the Government to compel certain industries to shut down, thus, in a measure, relieving the fuel situation. It is thought, also, that the embargo on shipments to Canada will have a certain effect in loosening up the present stringency. While some scattering sales of $2 coal are reported, these are few and far between, and, in the vast majority of cases, are made in order to release cars and thus avoid the payment of demurrage.—*Coal Age.*

A New Service

Herewith THE AUTOMOBILE AND AUTOMOTIVE INDUSTRIES *supplies for the benefit of its readers a general summary of important developments in other fields of business. This is rendered possible by the editorial cooperation of leading industrial publications which are recognized authorities.*

By compressing the general industrial situation into this form we hope to give our readers a clear and comprehensive idea of up-to-the-minute developments which they could otherwise secure only with considerable expenditure of time and effort.

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1918 Bour-Davis $1,650—New Four Has Overhead Valves

CHICAGO, Oct. 6—The 1918 Bour-Davis will be built only as five-passenger cars and will sell at $1,650, plus the war tax of 3 per cent.

The specifications include a six-cylinder Continental 7 3½ by 5¼ engine developing 29.4 hp. The starting system is Westinghouse, carbureter Rayfield, ignition is battery, Remy igniter, clutch is the Borg & Beck, dry plate, wheelbase 118 in. and tires 33 by 4½.

The Shadburne Bros. Co., which recently purchased the assets of the Bour-Davis Motor Car Co., will shortly have ready for the market a four-cylinder 3¾ by 5, overhead valve motor of its own design. The starting system is Westinghouse, carbureter Miller, ignition Eisemann magneto and tires 32 by 4. The car will be four-passenger and will sell at $1,385. The five-passenger model will also sell at $1,385. The company will later build a raceabout with wire wheel equipment and with special high-speed accessories. This will sell at $1,500.

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New Motor Is Gearless

GREEN BAY, WIS., Oct. 6—The Crank Shaft Valve Movement Corp., which was organized at Green Bay recently with $300,000 capital stock, will manufacture and market a new type of internal combustion engine designed by Jules Gerard, a well-known Green Bay engineer. The feature of the new engine is that it is gearless and all reciprocating parts and accessories, including the valves, magneto, generator and pump, are operated directly from the crankshaft.

The Gerard motor may be adapted for use on passenger and commercial cars, airplanes, tractors and boats. An engine weighing about 350 lb. developed 60 to 70 hp. As soon as a sufficient amount of business has been booked a factory will be erected in Green Bay and the engine produced on a large scale. Associated with Mr. Gerard are A. L. Cannard, Sylvester Duquaine, Julian Conard and John Findeisen, all of Green Bay.

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Edsel Ford Denied Claim for Exemption

DETROIT, Oct. 8—Edsel Ford, vice-president and secretary of the Ford Motor Co. and a partner of Henry Ford & Son, tractor manufacturers, was denied his claim for exemption from military service by the district draft board. Mr. Ford entered his claim on industrial grounds, contending that he now ranks next to and relieves his father, Henry Ford, in the actual administration of the automobile and tractor plants which are now turning out airplane parts, ambulances, tractors and trucks for Government service. Edsel Ford is married and recently became the father of Henry Ford the second. The district board notified him that he would not have to appear for duty until the second draft call. Mr. Ford has not stated whether he will appeal his claim to President Wilson or not.

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N. Y. Office for Blue Ribbon Body

NEW YORK, Oct. 5—The Blue Ribbon Body Co., Bridgeport, has established a New York sales office at 1823 Broadway. Charles Baasch, formerly with the Springfield Body Corporation, has been appointed manager of this office.

Brigadier-General Chauncey B. Baker

Promotion Immediately Confirmed by Senate — His Lengthy Military Service

WASHINGTON, Oct. 9—It is now Brigadier General Chauncey B. Baker, Quartermaster Corps, United States Army, the Senate having promptly confirmed the nomination of Colonel Baker to be a Brigadier General, as announced in the last issue of *Automotive Industries*. General Baker represents that element in the Army which wins recognition by sheer ability and force of character, and his promotion to chief of the transportation division of the Army, will be of unusual interest to manufacturing and transportation circles. It comes as a result of the excellent work he has done since war with Germany was declared.

General Baker has had supervision of the purchase of all motor equipment for the army, and he has been especially active in connection with the standardization of the military motor truck, now an accomplished fact. In everything having to do with the designing of the motor for this truck, and the standardization of parts, General Baker has been at the head, this bringing him into close relationship with the automotive industries of the country.

General Baker, early in his army career, won a reputation for hard work which still stays with him. As head of the transportation branch of the army, General Baker has a position second to no other in importance as far as the successful handling of the war is concerned. The motor car end is, of course, only one of the branches for which he is responsible, important as this is.

It was in connection with the occupation and, later, the evacuation of Cuba, that General Baker, then a Captain, won distinction for his masterly handling of transportation problems, opening the eyes of his superiors, and not only saving the government great sums of money, but establishing new standards for the transportation of forces in the field.

At another time he performed miracles, from the viewpoint of old and exceptionally experienced railroad executives, in the handling of troops and their supplies out of Fort Riley, Kansas. In fact, in every instance and in every activity of Colonel Baker since entering the army he has shown this grasp of problems, that executive ability, and that personality which go to make the successful army officer.

With the prestige carried by his new rank, and the wonderful field of activity offered by the transportation branch just at this time, he is expected to more than justify by his accomplishments the recognition which has been given him by the President, his superiors in the war department, and the United States Senate.

Brigadier-General Chauncey B. Baker

General Baker is a native of Ohio, an honor graduate of the Infantry and Cavalry School, 1889, a B.S. Ohio State University, 1904. General Baker is married and his home now and for some years has been in Washington.

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Cooper Joins Q. M. Department

TOLEDO, OHIO, Oct. 9—M. S. Cooper, formerly manager of the commercial car division of the Willys-Overland, Inc., has joined the quartermaster's department and will be captain in charge of transportation and transports.

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Old Reliable Plant for L. I.

LONG ISLAND CITY, N. Y., Oct. 10—The Old Reliable Motor Truck Co., Chicago, will build a $100,000 two-story plant in this city at Harris and Ely Avenues. This company manufactures worm-drive trucks.

General Baker's Lengthy Record in Service of U. S.

PERMANENT ESTABLISHMENT

Cadet—Military Academy	July 1, 1882
2nd Lieutenant—7th Infantry	July 1, 1886
1st Lieutenant—7th Infantry	Sept. 29, 1892
Captain—Infantry	Mch. 2, 1899
Captain—Q. M. Corps, by detail	April 11, 1901
Transferred to Q. M. Dept	July 1, 1902
Major—Q. M. Corps	Jan 22, 1904
Lieut. Colonel—Leputy Q. M. General	March 3, 1911
Colonel—Q. M. Corps	May 15, 1917

IN VOLUNTEER SERVICE

Captain—A. Q. M.	May 28, 1898
Major—Qr. Mr.	Jan. 7, 1899
Honorably Discharged	Jan. 30, 1901
Total Service	35 years, 3 months

SERVICE

Cadet—U. S. Military Academy	July, 1882-July, 1886
2nd Lieutenant—Fort Laramie, Fort McKinley, Bellevue Rifle range and in the field	1886-1887
2nd Lieutenant—Student Officer, Infantry and Cavalry School, Fort Leavenworth	1887-1889
2nd Lieutenant—Instructor Engineering	1889-1890
2nd Lieutenant and 1st Lieutenant A. D. C.—Acting Engineer Officers Headquarters Depts., Arizona and Colorado	Sept., 1890-April, 1895
1st Lieutenant—Fort Logan, Colo., and in the field	1895-1898
1st Lieutenant—Acting Regimental Qr. Mr., Camp Thomas and Tampa, Florida	April and May, 1898
Capt. Q. M. Volunteers—Chief Qr. Mr. 2nd Div. 7th Army Corps and Acting Chief Qr. Mr. 7th Army Corps	May, 1898-Oct., 1898
Depot Q. M., Savannah	Oct. and Nov., 1898
Depot Q. M., Havana, Cuba	Nov., 1898
Capt. and Major Q. M. Volunteers—Chief Qr. Mr., Havana, Cuba, and detailed office of Division and Department of Cuba	1900-May 21, 1902
Capt. Q. M.—On duty office of Qr. Mr. General	May, 1902-Oct., 1906
Major Q. M.—Chief Qr. Mr., Army of Occupation, Havana, Cuba	Oct., 1906-April, 1909
Major Q. M.—Commanding Philadelphia Depot	April, 1909-Oct., 1912
Lieut. Col.—On duty office of Qr. Mr. General. In charge of Transportation Division.	Oct., 1912-April, 1914
Depot and Base Q. M., Vera Cruz	May, 1914-Nov. 23, 1914
On duty Office of Qr. Mr. General. In charge of Transportation Division	1916
Colonel—On duty in the office of the Quartermaster General in charge of transportation division as Assistant and Chief of embarkation service under Chief of Staff. Also, head of military commission sent to France for purposes of observation, following declaration of war by United States against Germany	May 15, 1917

EDUCATIONAL

Graduate—U. S. Military Academy	July 12, 1886
Honor Graduate—Infantry and Cavalry School, Fort Leavenworth	1889
B. S.—Ohio State University	1904
Instructor Field Engineering—Infantry and Cavalry School	1889-1890
Lecturer—Naval War College	1895
Lecturer—Army War College	1911-1915
Lecturer—Army Medical School	1905-1906
Lecturer—Staff School, Fort Leavenworth	1915
Lecturer—Various autumn maneuvers, Fort Riley, West Point, Ky., and National Guard	1903-1904

PUBLICATIONS

Notes on Fire Tactics	1890
Transportation of Troops and Material	1905
Co-ordination between the Transportation Companies and the Military Service	1915

UNPUBLISHED BUT APPROVED BY HIGHER AUTHORITY

Handbook on Rail Transportation	1916
Handbook on Water Transportation	1916
Organiation and Regulations for Pack Transportation	1913
Organization and Regulations for Wagon Transportation	1913
Organization and Regulations for Motor Transportation	1914

20,000 Cars for Chalmers

Will Be of Highest Quality, Says Flanders—Old Maxwell Staff Retained

DETROIT, Oct. 6—Walter Flanders, president of the Maxwell Motor Co., states that he will not promise Chalmers dealers more than 20,000 cars this next year, but has assured them that each one will be of the highest quality. The general staff, which is now moving to the Chalmers plant, is practically the same as the old Maxwell staff and includes Thomas J. Toner, sales manager of both companies and also in charge of advertising. Mr. Toner has been with Mr. Flanders through several of his business successes. Walter M. Anthony, who has worked with Mr. Flanders since he took over the Maxwell company 4 years ago, is comptroller. Charles Adams, also a veteran Flanders lieutenant, is production manager. Wm. Kelly and E. J. Miles are engineers. Roy M. Hood is purchasing agent and Carl H. Pelton is assistant to President Flanders. Mr. Pelton, an attorney, also looks after the legal business of both companies. B. A. Lyman is assistant treasurer; J. H. Johnston, general auditor, and Gordon Muir, advertising manager. The Maxwell Motor Co. will maintain a sales department at the Maxwell factory to take care of Maxwell dealers who visit Detroit.

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460,639,407 Barrels Petroleum in 1916

(*Continued from page* 644)

An increase of 12 per cent in the quantity of petroleum marketed in the first 7 months of 1917 compared with 1916 and of nearly 19 per cent in the quantity consumed in the same period is shown in a table prepared by J. D. Northrop, of the United States Geological Survey. The table shows the quantity of petroleum marketed, the stocks of crude oil on hand at the end of each month and the consumption of petroleum in the United States, as calculated from these statistics, since the beginning of 1916.

The statistics for 1917 are based on statements filed monthly with the Geological Survey by the principal pipe line and refining companies, except those in California, that handle petroleum or receive it directly from the field, but include certain estimates, such as that for oil consumed in the field for drilling, for which exact statistics are not at hand.

Statistics of the petroleum industry in California are based on monthly statements issued by the Independent Oil Producers Agency at Los Angeles and by the Standard Oil Co. of California at San Francisco.

Stocks of crude oil held by pipe-line companies, marketing agencies and refiners who receive all or part of their oil direct from wells increased 3,383,974 barrels during the first 7 months of 1916, but decreased 7,421,000 barrels in the corresponding period in 1917. The average daily draft on stocks in July, 1917, was 47,000 bbl., and the average for the first 7 months of the year was 35,000.

Crude Petroleum Marketed, Consumed and Held in Stock in the United States, January, 1916, to July, 1917, Inclusive, in Barrels of 42 Gallons Each

Month	Quantity Marketed	Consumption	Stocks
1916			
January	23,181,022	21,115,549	187,965,265
February	22,733,550	21,126,277	189,572,538
March	25,523,666	25,755,303	189,340,901
April	24,024,447	24,804,985	188,560,363
May	26,015,713	25,418,752	189,157,324
June	25,539,611	26,563,582	188,133,353
July	25,379,700	24,229,287	189,283,766
August	25,206,566	28,328,130	186,162,202
September	25,261,174	28,750,037	182,673,339
October	26,747,529	28,215,247	181,005,621
November	25,301,138	28,438,809	177,867,950
December	25,853,042	29,692,641	174,028,351
Total 12 months	300,767,158	312,438,599	174,028,351
Total 7 months	172,397,709	169,013,835	189,283,766
1917			
January	27,431,000	28,795,000	172,664,000
February	24,399,000	24,960,000	172,104,000
March	28,448,000	29,322,000	171,230,000
April	27,615,000	27,933,000	170,912,000
May	28,202,000	29,791,000	169,323,000
June	27,917,000	29,182,000	168,057,000
July	29,344,000	30,794,000	166,607,000
Total 7 months	193,356,000	200,770,000	166,607,000

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Detroiter in Receiver's Hands

DETROIT, Oct. 4—The Detroiter Motor Car Co. has been placed in the hands of a receiver and the Security Trust Co., Detroit, has been named as trustee. The Security Trust Co. will endeavor to determine the assets and liabilities of the company and will then notify creditors.

—

Caine Made Aircraft Captain

TOLEDO, Oct. 9—George H. Caine, foreman of the Willys-Overland, Inc., heavy machinery department, has received his appointment as captain in the Government aircraft production board. Caine was formerly connected with the Cadillac Motor Car Co. of Detroit. He leaves immediately to assume his new duties.

U. S. Rubber Earns $7,239,966

Report for First Six Months Indicates Highest Record in Company's History

NEW YORK, Oct. 8—The largest earnings in the history of the United States Rubber Co. are reported in the first 6 months' statement of this year. During that period the company earned $7,239,966, an increase of 53 per cent over the same period of 1916, when $4,920,650 was earned. The 1917 earnings are after deducting $500,000 for special war tax. The earnings are at the annual rate of $14,479,932, or $27 a share for the $36,000,000 common stock after deducting dividends of $4,800,000 on the $60,000,000 preferred stock. The company earned $15.12 on the same amount of stock in 1916. Business for July, August and September is running at the same rate as for the first 6 months.

—

Meridian Plant Not Bought by Olympian

INDIANAPOLIS, Oct. 5—The recent report in the AUTOMOTIVE INDUSTRIES that the Olympian Motor Co., Pontiac, had bought the Meridian Mfg. Co., Indianapolis, was an error, as the Meridian plant is still operating and manufacturing bodies. It is now producing 19,000 bodies and is taking on new contracts. All the Olympian company purchased at this plant was stock to build 400 bodies.

—

To Sell Drexel at Auction

CHICAGO, Oct. 6—The entire plant of the Drexel Motor Car Corp. will be sold at public auction by order of the United States District Court Oct. 24-25. The bankrupt inventory value is more than $400,000. The plant is fully equipped for making cars and includes a stock of parts and supplies, motors, bodies, etc., worth more than $200,000, according to the inventory. Harry B. Staver is trustee.

World's Production of Petroleum in 1916

Country	Production in 1916: Barrels of 42 Gal.	Production in 1916: Metric Tons	Production in 1916: Percentage of Total	Total Production from 1857 to 1916, Inclusive: Barrels of 42 Gal.	Total Production from 1857 to 1916, Inclusive: Metric Tons	Total Production from 1857 to 1916, Inclusive: Percentage of Total
United States	*300,767,158	40,102,288	65.29	3,917,328,402	522,310,554	60.46
Russia	†72,801,110	9,933,387	15.81	1,763,583,017	232,917,643	27.22
Mexico	39,817,402	5,308,987	8.64	163,087,779	21,728,995	2.52
Dutch East Indies	‡13,174,399	1,820,247	2.86	162,174,312	21,849,705	2.50
Roumania	†10,298,208	1,432,296	2.24	140,310,595	18,910,174	2.16
India	§8,228,571	1,097,143	1.79	89,820,956	11,976,127	1.39
Galicia	6,461,706	898,670	1.40	142,494,206	19,817,034	2.20
Japan and Formosa	2,997,178	399,624	.65	33,166,800	4,422,230	.51
Peru	2,550,645	340,086	.55	19,344,868	2,579,315	.30
Trinidad	§1,000,000	139,082	.22	3,819,430	531,214	.06
Germany	995,764	§140,000	.22	14,957,097	2,015,974	.23
Argentina	870,000	116,000	.19	1,903,121	267,693	.03
Egypt	411,000	54,800	.09	1,759,936	234,658	.03
Canada	198,123	26,416	.04	23,907,197	3,187,626	.37
Italy	43,143	§6,000	.01	889,513	125,884	.02
Other countries	§25,000	3,333		397,000	52,933	
	460,639,407	61,818,359	100.00	6,478,944,229	862,927,759	100.00

*Marketed production. †Estimated in part. ‡Includes British Borneo. §Estimated.

Cruiser Motor Co. Buys 21-Acre Site in Madison

MADISON, WIS., Oct. 6—The Cruiser Motor Car Co., which was incorporated recently under the laws of Maine with a capital stock of $250,000, has purchased a 2½-acre site on East Johnson Street, Madison, for its proposed new works and offices. Plans for the first buildings of the new group are now being completed and contracts will be awarded about the middle of October for a main shop, office and transformer house costing about $75,000. Eventually the investment will be in excess of $200,000. As already noted, the Cruiser company will manufacture a convertible touring-camping car, especially adapted to field service, and it is stated that the Government already has made an informal bid for about 500 of the vehicles.

—

Barnes Foundry Starts Construction

DETROIT, Oct. 8—The Barnes Foundry & Mfg. Co. is starting construction of its new plant on the River Rouge. The first unit of the plant will occupy one-third of the property and represents an investment of $350,000.

—

Bukolt Employs Women

STEVENS POINT, WIS., Oct. 6—Because of the depletion of its ranks by enlistments and the selective draft, and the acute shortage of male help, the Bukolt Mfg. Co., maker of steel tire protectors for pneumatic tires, has started to employ girls and young women in its plant. At this time 25 girls are employed, and if a sufficient number are available the number will be increased to at least 100.

—

St. Louis to Help Local Industries

ST. LOUIS, MO., Oct. 8—The Chamber of Commerce of this city is forming a $2,000,000 corporation which will loan money and in other financial ways assist concerns desiring to locate in St. Louis.

—

Air-O-Flex Starts Factory

DETROIT, Oct. 8—The Air-O-Flex Motor Corp., lately organized, as told in a recent issue of AUTOMOTIVE INDUSTRIES, has completed plans for a group of factory buildings which will be constructed in units with more than 300,000 sq. ft. of floor space. Construction of the first unit starts at once.

The 1½-ton truck which the company will produce is fitted with a Continental motor, 3¾ by 5¼. Price of the chassis with cab will be $1,700.

—

Edward A. Cassidy Holds First Convention

NEW YORK, Oct. 8—The Edward A. Cassidy Co., manufacturers' representative, called in all of the territorial sales heads for its first convention on Sept. 24 to 29. The Cassidy company, which is planning a particularly aggressive effort during the winter and for 1918, decided on a preparedness campaign, every territory being represented by its responsible head, and a complete canvass made of national and local business conditions, with particular reference to the character of accessories sold through the company.

Current News of Factories

Notes of New Plants—Old Ones Enlarged

—

Raybestos Issues Booklet

BRIDGEPORT, Oct. 8—"Dimensions of Brake Linings and Truck Facings" is the title of a booklet recently issued by the Standard Woven Fabric Co. It contains full dimensions of brake lining and truck facings for practically all cars built within the past 4 or 5 years. It may be had for the asking and should prove valuable to every repairman.

—

$120,000 Addition for Marmon

INDIANAPOLIS, Oct. 7—The Nordyke & Marmon Co., which has a contract for manufacturing airplane motors for the United States Government, will make additions to its plant to cost about $120,000. This makes the third large addition built during the last 90 days.

—

ELECTIONS

SALEM, OHIO, Oct. 5—The Porter Rubber Co. has elected the following directors: A. H. Boyd, L. H. Brush, Grant Hill and J. B. Rea, of Salem, and E. E. Boyd, D. P. Hopkins and J. S. Hess, of Pittsburgh.

The executive board for the ensuing year will be composed of A. H. Boyd, E. E. Boyd, H. M. Schmitt and E. A. Young, all but the first of Pittsburgh.

Mr. Schmitt is secretary and general manager of the National Ben Franklin Insurance Co.; Mr. Young is secretary and treasurer of the Real Estate Savings & Trust Co., both of Pittsburgh.

—

WAUKESHA, WIS., Oct. 6—The Waukesha Truck Brake Co., Waukesha, Wis., organized some time ago with $25,000 capital, will manufacture a braking system for motor trucks, designed by F. H. Halladay, Appleton, Wis. The company has elected the following officers: President, E. L. Arnold, Milwaukee; vice-president, J. L. Able, Milwaukee; secretary, F. H. Halladay, Appleton; treasurer, W. S. Halladay, Appleton.

—

NEW YORK, Oct. 6—At Friday's meeting of the board of the Chevrolet Motor Co., R. S. McLaughlin, president of the Chevrolet Motor Co. of Canada, was elected a director of the Chevrolet Motor Co., the Delaware corporation.

Lincoln Motor Co. Begins Building Trucks

INDIANAPOLIS, IND., Oct. 8—The Lincoln Motor Co., Anderson, Ind., which recently was organized and leased an industrial plant there, started operations last week. The company will manufacture motor trucks. R. J. Walker, of Anderson, is president; M. G. O'Brien, of Evansville, Ind., is vice-president; Ernest Bausch, of Detroit, is assistant manager, and Albert Lowman, of Anderson, is secretary.

—

Kelly-Springfield Tire to Advance Prices

NEW YORK, Oct. 8—The Kelly-Springfield Tire Co. will advance the price of its tires 10 per cent on Oct. 15. When the last tire price readjustment occurred at the beginning of September, several of the leading makers held out. Kelly-Springfield is the last of these to go up on account of the increased cost of materials, labor, etc.

—

Universal Gets Deal Plant

JONESVILLE, MICH., Oct. 8—The Universal Body Co., of this city, has purchased the Deal Buggy Co. plant at Alma, Mich., and expects to have 100 men working within the next 6 months.

—

Metal Specialties Adds

CHICAGO, Oct. 6—The Metal Specialties & Mfg. Co. has added a new building, 100 by 160 ft., four floors.

—

Mason Tire Convention Oct. 11-12

KENT, OHIO, Oct. 5—The Mason Tire & Rubber Co. will hold a general sales convention Oct. 11 and 12. This will include the entire sales force, which now covers every part of the United States. More than forty branch managers and salesmen will be on hand to talk over the sales problems of the coming year.

—

Lozier Leases Standard Truck Plant

DETROIT, Oct. 8—The former plant of the Standard Auto Truck Co. has been leased to the Lozier Motor Co. for $10,000 a year. The Lozier Motor Co. was recently incorporated, as told in a previous issue of AUTOMOTIVE INDUSTRIES.

—

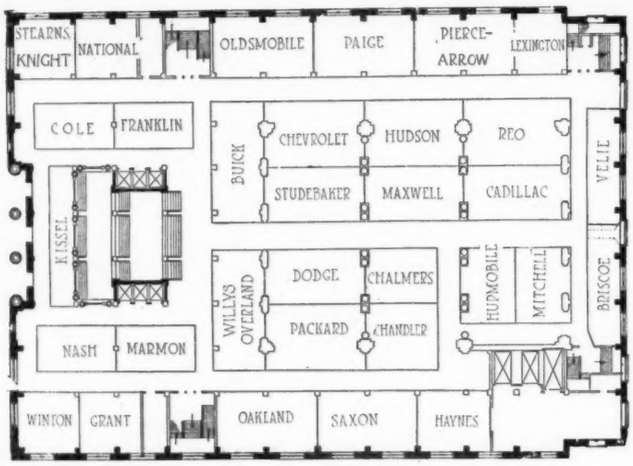
Stutz to Build

INDIANAPOLIS, IND., Oct. 7—The Stutz Motor Car Co. will construct a new concrete and steel machine shop to cost about $40,000. Work on the structure will be started in the near future near the company's present plant at Tenth and Roanoke Streets.

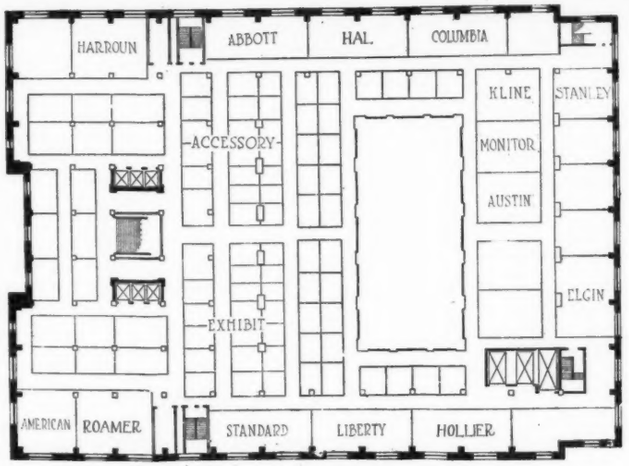
—

Humboldt to Increase Space

LONG ISLAND CITY, N. Y., Oct. 8—The Humboldt Machine & Stamping Co. will increase the size of its plant 50 per cent. This addition is being constructed now and work in it will start by Jan. 1.

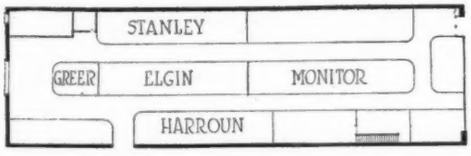


First Floor, Grand Central Palace, New York

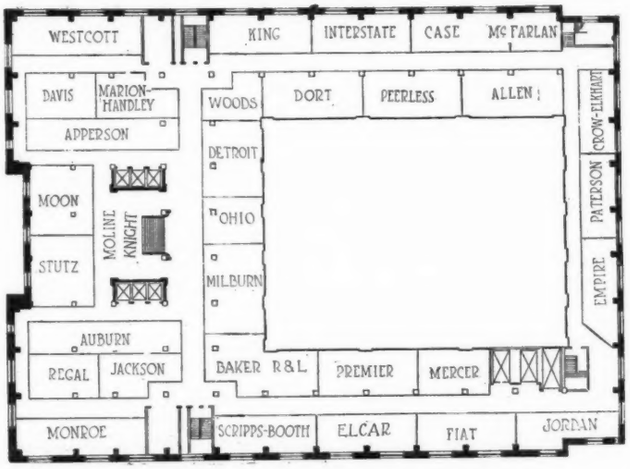


Second Floor, Grand Central Palace, New York

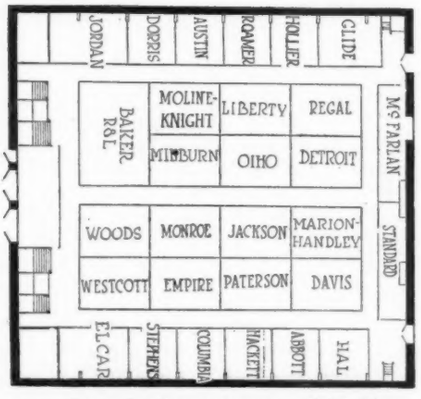
National Show Plans for New York and Chicago Car Exhibitors



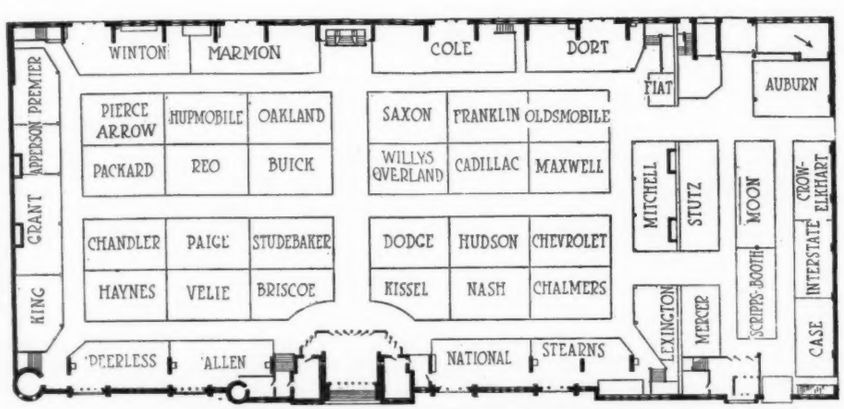
Greer Bldg., Chicago



Third Floor, Grand Central Palace, New York



First Regiment Armory, Main Floor, Chicago



Coliseum, Main Floor and Coliseum Annex, Chicago

National Show Space Allotted

Stanley Steamer a Newcomer —Both Car and Accessory Space in Big Demand

NEW YORK, Oct. 4—The New York and Chicago automobile shows to be held in January will be nearly as great successes as last year if the interest at the drawing which was held to-day for spaces at both shows is any indication of the interest the manufacturers are displaying in the shows. Following the custom of previous years, practically all members of the N. A. C. C. were at headquarters here to-day, where the drawing for show space was conducted by S. A. Miles, the veteran manager of the two shows who came from his summer home, Christmas Cove, Maine, to handle the work. Col. Chas. Clifton, the perpetual president of the association, was present, as was Alfred Reeves, general manager. Show-drawing day is always one of the biggest in the association year and to-day was no exception. Headquarters were filled from early morning until late in the afternoon, when the work was completed.

To-day seventy-eight different automobile manufacturers drew space for the Grand Central Palace show to be held in New York Jan. 5 to 12. Of these seventy-two were gasoline manufacturers, five electrics and one steamer. This list represents but one new exhibitor as compared with a year ago, namely, the Stanley steamer.

While the number drawing for space this year is approximately twenty less than that of a year ago, the firms drawing this year represent the best in the industry. Among those who were present last year but will be missed this year at New York are: Ben Hur, Bour Davis, Briggs-Detroiter, Cunningham, Bateman, Barley, Doble, Drexel, Emerson, Enger, Ingram-Hatch, Kent, Lozier, Majestic, Metz, Pullman, Pathfinder, Princess, Sun and Sterling. There will be several additional exhibitors added to the present list for the coming season before the show opens, as there remains several spaces on the third floor of the Palace and several spaces on the fourth floor. The fourth floor offers a good deal of flexibility by way of taking in new exhibitors so that there should be ample room for late comers.

The exhibit of electrics at New York will be practically the same as a year ago. They have been given a space by themselves on the second floor, where the following makes will exhibit: Woods, Detroit, Ohio, Milburn and Baker-R. & L. With the Baker-R. & L. exhibit will be the Owen magnetic cars.

The privilege of making first choice for the New York show fell to Willys-Overland, a privilege which it has enjoyed for the past 3 years. Second position was drawn by Buick and third by Dodge. Others in order of drawing were: Studebaker, Maxwell, Chevrolet, Cadillac, Hudson, Packard, Reo, Oakland, Chandler, Saxon, Paige, Oldsmobile, Pierce-Arrow, Chalmers, Mitchell, Hupmobile, Franklin, Haynes, Marmon, Nash, Velie, Cole, Dort, Winton, Grant, National, Kisselkar, Stearns, Briscoe, Stutz, Peerless, Allen, Premier, King, Lexington, Scripps, Moon, Auburn, Apperson, Crow, Inter-State, Mercer, Case, Marion-Handley, Elcar, Jackson, Fiat, Empire, Westcott, Monroe, Paterson, Regal, Davis, Moline, Liberty, Jordan, Standard, McFarlan, Abbott, Hollier, Hal, Columbia, Kline and Austin.

The representation of manufacturers present was very good compared with former years. The majority of the factories had their leading men present to select the space, but some of them delegated the work to their New York distributors or dealers.

As soon as drawing for the New York show was completed, the drawing for space for the Chicago show to be held in the Coliseum and Armory was taken up. The same order of drawing was followed out and the four leaders, namely, Willys-Overland, Buick, Dodge and Studebaker, selected the four corner spaces in the center of the Coliseum. All of the space in the Coliseum, Annex and Armory was taken. In addition, several of the spaces in the Greer building were drawn. There still remains several spaces in the Greer building to be allotted, and when these are taken spaces in the basement of the Coliseum Annex will be available.

The exhibitors at the Chicago show are practically the same as at the New York show, with the exception that Glide and Dorris will be at Chicago.

There are several concerns which exhibited last year at Chicago but will not be there at the coming show. Among these are: American, Ben Hur, Briggs-Detroiter, Classic, Cunningham, Dixie, Emerson, Enger, Hassler, McFarlan, Maibohm, Metz, Pan American, Pathfinder, Princess, Pullman, Sun and Standard. It is possible that some of these may later decide to take space in Chicago.

The figures show that already eighty exhibitors have drawn space for the Chicago show as compared with ninety-four drawn a year ago. It is impossible to state as yet how many exhibitors Chicago will have, as new names will be added from week to week. The exhibit of electrics in Chicago will be similar to last year, space being allotted to them along the center aisle of the Armory. The exhibitors will be Woods, Detroit, Ohio, Milburn and Baker-R. & L. The Stanley steamer will be exhibited for the first time.

NEW YORK SHOW EXHIBITORS

Main Floor—Automobile Section

Buick Motor Co.	Flint
Briscoe Motor Corp.	Jackson
Cadillac Motor Car Co.	Detroit
Chalmers Motor Co.	Detroit
Chandler Motor Car Co.	Cleveland
Chevrolet Motor Co. of Mich.	Flint
Cole Motor Car Co.	Indianapolis
Dodge Brothers	Detroit
H. H. Franklin Mfg. Co.	Syracuse
Grant Motor Car Corp.	Cleveland
Haynes Automobile Co.	Kokomo
Hudson Motor Car Co.	Detroit
Hupp Motor Car Corp.	Detroit
Kissel Motor Car Corp.	Hartford, Wis.
Lexington-Howard Co.	Connersville
Maxwell Motor Corp.	Detroit
Mitchell Motors Co., Inc.	Racine
National Motor Car & Veh. Corp.	Indianapolis
Nash Motor Co.	Trenton
Nordyke & Marmon Co., Inc.	Indianapolis
Oakland Motor Car Co.	Pontiac
Olds Motor Wks.	Lansing
Packard Motor Co.	Detroit
Paige-Detroit Motor Car Co.	Detroit
Pierce-Arrow Motor Car Corp.	Buffalo
Reo Motor Car Co.	Lansing
Saxon Motor Car Corp.	Detroit
F. B. Stearns Co.	Cleveland
Studebaker Corp. of America	South Bend
Velie Motors Corp.	Moline
Willys-Overland, Inc.	Toledo
Winton Co.	Cleveland

Second Floor—Automobile Section

Allen Motor Co.	Fostoria
Apperson Bros. Auto Co.	Kokomo
Auburn Automobile Co.	Auburn
J. I. Case T. M. Co.	Racine
Crow-Elkhart Motor Co.	Elkhart
George W. Davis Motor Car Co.	Richmond, Ind.
Dort Motor Car Co.	Flint
Elkhart Carriage & Motor Co.	Elkhart
Empire Automobile Co.	Indianapolis
Fiat Automobile Co.	Poughkeepsie
Inter-State Motor Co.	Muncie
Jackson Automobile Co.	Jackson
Jordan Motor Car Co.	Cleveland
King Motor Car Co.	Detroit
McFarlan Motor Co.	Connersville
Mutual Motors Co.	Jackson
Mercer Automobile Co.	Trenton
Moline Automobile Co.	E. Moline
Monroe Motor Co.	Pontiac
Moon Motor Car Co.	St. Louis
W. A. Paterson Co.	Flint
Peerless Motor Car Co.	Cleveland
Premier Motor Corp.	Indianapolis
Regal Motor Car Co.	Detroit
Scripps-Booth Corp.	Detroit
Stutz Motor Car Co. of America	Indianapolis
Westcott Motor Car Co.	Springfield, Ohio

Third Floor—Automobile Section

Abbott Corp.	Cleveland
American Motors Corp.	Plainfield
Austin Automobile Co.	Grand Rapids
Columbia Motors Co.	Detroit
Elgin Motor Car Corp.	Chicago
Hal Motor Car Co.	Cleveland
Harroun Motors Corp.	Wayne, Mich.
Kline Car Corp.	Richmond, Va.
Lewis Spring & Axle Co.	Chelsea
Liberty Motor Car Co.	Detroit
Monitor Motor Car Co.	Columbus
Roamer Motor Car Co.	Chicago
Standard Steel Car Co.	Pittsburgh
Stanley Motor Carriage Co.	Newton

Second Floor—Electric Cars

Anderson Electric Car Co.	Detroit
Baker R & L Co.	Cleveland
Milburn Wagon Co.	Toledo
Ohio Electric Car Co.	Toledo
Woods Motor Vehicle Co.	Chicago

CHICAGO SHOW EXHIBITORS

First Regiment Armory, Main Floor, Automobile Section

Bartholomew Co.	Peoria, Ill.
Abbott Corp.	Cleveland
Austin Automobile Co.	Grand Rapids
Columbia Motors Co.	Detroit
George W. Davis Motor Car Co.	Richmond, Ind.

Dorris Motor Car Co.....St. Louis
Elkhart Carriage & Motor Car Co. Elkhart
Empire Automobile Co.....Indianapolis
Hal Motor Car Co.....Cleveland
Hackett Motor Car Co.....Jackson
Jackson Automobile Co.....Jackson
Jordan Motor Car Co.....Cleveland
Lewis Spring & Axle Co.....Jackson
Liberty Motor Car Co.....Detroit
McFarlan Motor Co.....Connersville
Maxwell Motor Corp.....Detroit
Moline Automobile Co.....E. Moline
Mutual Motors Co.....Jackson
W. A. Paterson Co.....Flint
Regal Motor Car Co.....Detroit
Roamer Motor Car Co.....Chicago
Standard Steel Car Co.....Pittsburgh
Stephens Motor Branch of Moline Plow Co. .....Freeport
Westcott Motor Car Co....Springfield, Ohio

Coliseum Main Floor and Coliseum Annex

Allen Motor Co.....Fostoria
Apperson Bros. Automobile Co.....Kokomo
Auburn Automobile Co.....Auburn
Briscoe Motor Corp.....Jackson
Buick Motor Co.....Flint
Cadillac Motor Car Co.....Detroit
Case, T. M. Co., J. I.....Racine
Chalmers Motor Co.....Detroit
Chandler Motor Car Co.....Cleveland
Chevrolet Motor Co.....Flint
Cole Motor Car Co.....Indianapolis
Crow-Elkhart Motor Co.....Elkhart
Dodge Bros. .....Detroit
Dort Motor Car Co.....Flint
F-I-A-T Co. .....Poughkeepsie
Franklin Mfg. Co., H. H.....Syracuse
Grant Motor Car Co.....Findlay
Haynes Automobile Co.....Kokomo
Hudson Motor Car Co.....Detroit
Hupp Motor Car Co.....Detroit
Inter-State Motor Co.....Muncie
King Motor Car Co.....Detroit
Kissel Motor Car Co.....Hartford
Lexington-Howard Co.....Connersville
Maxwell Motor Co.....Detroit
Mercer Automobile Co.....Trenton
Mitchell Motors Co.....Racine
Moon Motor Car Co.....St. Louis
Nash Motors Co.....Kenosha
National Motor Vehicle Co.....Indianapolis
Nordyke & Marmon Co.....Indianapolis
Oakland Motor Car Co.....Pontiac
Olds Motor Wks.....Lansing
Packard Motor Car Co.....Detroit
Paige-Detroit Motor Car Co.....Detroit
Peerless Motor Car Co.....Cleveland
Pierce Arrow Motor Car Co.....Buffalo
Premier Motor Corp.....Indianapolis
Reo Motor Car Co.....Lansing
Saxon Motor Car Co.....Detroit
Scripps-Booth Corp.....Detroit
Stearns Co., F. B.....Cleveland
Studebaker Corp. of America.....Detroit
Stutz Motor Car Co.....Indianapolis
Velie Motors Corp.....Moline
Willys-Overland, Inc.....Toledo
Winton Co. .....Cleveland

First Regiment Armory, Main Floor, Electric Cars

Anderson Electric Car Co.....Detroit
Baker R & L Co.....Cleveland
Milburn Wagon Co.....Toledo
Woods Motor Vehicle Co.....Chicago

Greer Building, Automobile Section

Elgin Motor Car Corp.....Chicago
Harroun Motors Corp.....Detroit
Monitor Motor Car Co.....Columbus
Stanley Motor Carriage Co.....Newton

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DIVIDENDS DECLARED

General Motors Corp. quarterly of 3 per cent on common and 1½ per cent on preferred, payable Nov. 1 to stock of record Oct. 15.

M. & A. M. Members Take Show Space

98 New York Show Allotments—Chicago Given 90 —Eight New Members

NEW YORK, Oct. 8—Ninety-eight accessory concerns last week were allotted space at the New York national show Jan. 5-12. This compares with 103 at the first drawing last year. Allotments for Chicago show space were given to ninety. More than 50,000 sq. ft. of space will be applied for this year at both shows. The biggest accessory space at the New York show was taken by the Parry Mfg. Co., which will have 800 sq. ft. But one M. & A. M. member canceled its application for show space due to the war. This company, however, is working on full time on Government contracts.

The executive committee after the show allotment held its first meeting on Thursday at Washington, where new members were elected, as follows:

Standard Steel Spring Co., Coraopolis, Pa.
Miller Transmission Co., New York.
Rand Mfg. Co., Haverhill, Mass.
Philips-Brinton Co., Kennett Square, Pa.
Rex Mfg. Co., Connersville, Ind.
Warner Lens Co., Chicago.
DuBois Piston Ring Co., Albany, N. Y.
W. E. Pratt Mfg. Co., Chicago.

The association decided at its meeting in Washington last Thursday to hold a meeting of the credit managers committee in Cleveland Oct. 18 at the Hollenden.

Last Thursday the Automotive Products Committee of the War Industries Board of the Council of National Defense was formed by members of the M. & A. M. A sub-committee was also formed and is known as the military committee, of which Brigadier General Baker is chairman. Other members include H. L. Horning, Coker Clarkson and C. W. Stiger.

New York Accessory Exhibitors

A-B-C Starter Co.....Detroit
American Bronze Co.....Berwyn, Pa.
American Ever Ready Works. Long Island City
Anderson Forge & Machine Co.....Detroit
Au-To Compressor Co.....Wilmington, Ohio
Becker Bros.....Chicago
Benford Mfg. Co.....Mt. Vernon, N. Y.
Brown-Lipe-Chapin Co.....Syracuse
Brunner Mfg. Co.....Utica
Buda Co.....Harvey, Ill.
Byrne, Kingston & Co.....Kokomo
Century-Plainfield Tire Co.....Plainfield
Champion Ignition Co.....Flint
Clark Equipment Co.....Buchanan, Mich.
Corbin Screw Corp.....New Britain
Corcoran-Victor Co.....Cincinnati, Ohio
Corning Glass Works.....Corning, N. Y.
Cowles & Co.....New Haven
Dann Products Co.....Cleveland
Detroit Pressed Steel Co.....Detroit
Dixon Crucible Co.....Jersey City
Doehler Die-Casting Co.....Brooklyn
Du Bois Piston Ring Co.....Albany
E. A. Laboratories, Inc.....Brooklyn
Eclipse Machine Co.....Elmira, N. Y.
Electric Storage Battery Co.....Philadelphia
Findeisen & Kropf Mfg. Co.....Chicago
Gabriel Mfg. Co.....Cleveland
Gemco Mfg. Co.....Milwaukee
Gould Storage Battery Co.....New York
Gray & Davis, Inc.....Boston
Halladay Co., L. P.....Philadelphia
Harrison Radiator Corp.....Lockport, N. Y.
Hartford, Inc., Edward V.....Jersey City
Hassler, Robert H.....Indianapolis
Hayes Mfg. Co.....Detroit
Hayes Wheel Co.....Jackson
Heinze Co., The John O....Springfield, Ohio
Heinze Electric Co.....Lowell, Mass.
Kellogg Mfg. Co.....Rochester
Kent Mfg. Works.....Philadelphia
Klaxon Co.....Newark, N. J.
Lipman Air Appliance Co.....Beloit
Mann Co., F. W.....Milford, Mass.
Merchant & Evans Co.....Philadelphia
Metal Stamping Co.....Long Island City
Miller Transmission Co.....New York
Mosler & Co., A. R.....Mt. Vernon, N. Y.
Moto-Meter Co., Inc., The..Long Island City
National Carbon Co.....Cleveland
New Era Spring Co.....Detroit
Parker Rust Proof Co. of America..Detroit
Parry Mfg. Co.....Indianapolis
Philips-Brinton Co.....Kennett Square. Pa.
Piel Co., The G.....Long Island City
Rand Mfg. Co.....Haverhill, Mass.
Raybestos Co., The.....Bridgeport
Rex Mfg. Co.....Connersville
Rowe Calk Co., The.....Hartford
Schrader's Son, Inc., A.....Brooklyn, N. Y.
Shakespeare Co .....Kalamazoo
Shaler Co., C. A.....Waupun, Wis.
S. K. F. Ball Bearing Co.....Hartford
Splitdorf Electrical Co.....Newark, N. J.
Standard Welding Co., Division Standard Parts Co .....Cleveland
Standard Woven Fabric Co..Walpole, Mass.
Stromberg Motor Devices Co.....Chicago
Superior Lamp Mfg. Co., Inc.....New York
Taft-Peirce Mfg. Co.....Woonsocket, R. I.
Universal Shock Eliminator, Inc..New York
Vacuum Oil Co.....New York
Van Sicklen Co., The.....Elgin
Veeder Mfg. Co., The.....Hartford
Voorhees Rubber Mfg. Co.....Jersey City
Waltham Watch Co.....Waltham
Warner Lens Co.....Chicago
West Side Foundry Co.....Troy, N. Y.
Wheeler-Schebler Carbureter Co., Inc., Indianapolis
Willard Storage Battery Co.. The..Cleveland
Wilson & Co.....Chicago
Woodworth Mfg. Corp., The...Niagara Falls

Chicago Only

Continental Motors Co.....Detroit
Edison Storage Battery Co....Orange, N. J.
General Electric Co.....Schenectady
Imperial Brass Mfg. Co.....Chicago
Oakes Co. .....Indianapolis
Vesta Accumulator Co.....Chicago
Wagner Specialty Co.....New York
Warner Gear Co.....Muncie
Waukesha Motor Co.....Waukesha

New York Only

Breeze Mfg. Co.....Newark, N. J.
Budd Mfg. Co.....Philadelphia
English & Mersick Co.....New Haven
Ericsson Mfg. Co.....Buffalo
Hale & Kilborn Co.....Philadelphia
Hartford Machine Screw Co.....Hartford
Herz & Co.....New York
Janney, Steinmetz & Co.....Philadelphia
Light Mfg. & Foundry Co.....Pottstown
Morse Chain Co.....Ithaca
New York Coal Co.....New York
Pantasote Co. .....New York
Sparks-Withington Co.....Philadelphia
Stewart-Warner Speedometer Corp..Chicago
Syracuse Malleable Iron Works....Syracuse
Wilson Body Co., C. R.....Detroit
Zenith Carburetor Co.....Detroit

Detroit Purchasing Agents Meet

Sherry of General Motors and Farthing of Government Speak

DETROIT, Oct. 4—At the meeting of the Detroit branch of the National Assn. of Purchasing Agents, held here last night, R. H. Sherry, metallurgist of the General Motors Co., and H. G. Farthing, one of the representatives of the United States Government stationed at the Fisher Body Corp., made short addresses.

The meeting was the first of the fall season, and indicated that the new association, which was formed through the efforts of The Class Journal Co. last spring, is thriving. The outlook is for a number of excellent meetings during this season, and the association is already proving to be of value to its members through its employment department and through its arrangements for interchanging materials among purchasing agents where the supply happens to be long at one factory and short at another. The secretary of the association is provided by each of the purchasing agents with a list of materials which they have to dispose of and also of the wants of the different members.

Mr. Farthing told the members of the changes in factory conditions in England since the war started. He stated that owing to the fact that a large number of American efficiency experts had been called in, the entire production system had been put on the most modern scale, and that the result of this is that after the war England is bound to be one of our greatest competitors. He mentioned particularly plants in Leicestershire and Glasgow, where chains of former plants had been connected into single units several miles long, in which a true progressive system of manufacture is carried out. He stated that in the Leicestershire plant iron ore was taken in at one end and at the other end 14 in. rifles are delivered. In the plant at Glasgow he stated that 7,000,000 shells per week are turned out, whereas the entire productive ability of England before the war was 4,500,000 per week.

Sherry Discusses Purchasing Problems

Mr. Sherry gave a short talk on the problems which the purchasing agent must meet in the selection of metals. He said that the fundamental materials from which the purchasing agent had to work are the specifications, and that everything possible must be done to see that the materials secured are in accordance with these. Mr. Sherry pointed out that in view of the uncertain conditions existing at present the purchasing agent must develop new sources for securing his materials. He said this is particularly true of tool steel. The purchasing agent is very apt to select a certain steel because of the name of the company selling it. He hears, for instance, that a certain tool steel made by Smith is giving good results and he orders a considerable quantity of it. What may happen is that he gets a carelessly treated quantity of tool steel, with the result that no saisfaction is obtained with the material, and it becomes a loss upon his hands.

One of the points which the purchasing agents must indirectly watch is that good materials are not spoiled in the handling and, furthermore, that the specifications are so arranged that they cover any troubles which are likely to happen in the specific part for which the materials are bought. Ninety per cent of such troubles cannot be cured directly in the shop. They are due to design and the selection of the material. Very often, Mr. Sherry said, expensive tests can be replaced by a simple machine test in which the piece to be tested is put through some simple machine operation which would indicate its hardness. This is a practical way of making the test and gives a direct clue as to the merits of the material for certain kinds of work.

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Wilson Adds 5-Tonner

DETROIT, Oct. 9—The J. C. Wilson Co. will bring out a brand new 5-ton, worm drive truck on Jan. 1, 1918. It conforms in design and detail with the present Wilson ½ and 3½-ton trucks. It will probably be exhibited for the first time at the Boston show on March 2-9.

Sunbeam Engine Rights Offered

Owners of American Rights Want Same Royalty as Great Britain Pays

WASHINGTON, Oct. 8—The owners of the American rights to the manufacture of the British Sunbeam airplane motor were to-day offered at cost to the Government. The offer was made to Secretary of the Navy Daniels by A. P. Homer of Boston, A. W. Church and George C. Beach of New York. These men will turn over the rights, for which they will be paid $3, $1 a piece, to make the transaction legal.

The U. S. Government, if it accepts the offer, will have to pay exactly as much as the British Government does in royalties. The British Government is building the Sunbeam motors under the license plan. The United States will also have the right to all improvements in the motor developed abroad.

The offer made to-day is open for 30 days to permit of investigation and will continue in force only until the war is ended.

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Dunham Moves Offices to Cleveland

BEREA, Oct. 5—The Dunham Co., Berea, manufacturer of gray iron castings, has moved its general offices to 801-804 Hippodrome Building, Cleveland. The foundries will remain at Berea.

Future Business Appears Uncertain

(*Continued from page* 643)

of cars. Yet, many dealers handling these cars, selling to farmers and to city trade, located in the East, Middle West and far West, complain of decreasing demand. So that the dealers handling the same lines are found making conflicting reports and engaged in both prosperous and unprofitable business.

One point noticeable now is that those manufacturers with high class dealer organizations are doing the largest business; that those whose dealer organizations suffered most severely from panic during the first days of the declaration of war have not yet recovered.

Several higher-priced car makers including Cadillac and Hudson have enjoyed exceptionally good business during the last few weeks and have apparently recovered completely from the slump that was noticeable during the summer months. High-priced enclosed cars together with those of popular price are in great demand and reported to be scarce in consequence.

Parts makers, uncertain of the future, and doubtful of the financial standing of many car makers find themselves doing between 50 per cent and 60 per cent of capacity business. Many prefer this to the extension of credit to the doubtful companies, even though the decreased business means both loss of money and a disrupted shop organization. They report that the truck business in which the Government is placing large orders has not yet progressed to the point where the parts makers are receiving considerable business through it, while in the main the passenger car business, except for ten or twelve concerns, has slumped to a degree that is not made up by the truck parts demand. They describe conditions as being "soft in spots" with good demand from such concerns as have been mentioned above and a lessening demand from many others.

Almost all of the parts makers, however, anticipate a large, steady and substantial business on the class B truck for the Government, orders for which are being placed now. These contracts it is expected will more than care for the declining passenger car business, and are considerably more substantial and satisfying from the financial credit viewpoint.

Small manufacturers of popular priced cars continue to suffer from declining business.

The Franklin Automobile Co., which produced 285 cars during the week ending Sept. 29, has had a steady and increasing demand. The Saxon Motor Car Corp. reports a growing export demand and an increase in domestic business. Saxon produced an average of 130 cars per day during the past 7 days.

No Tire Increase in Canada

Net Rise Since 1914 Only 30 Per Cent — Prices There 20 Per Cent Higher

TORONTO, ONT., Oct. 9—Although tire prices were advanced by United States manufacturers on Sept. 1, there is little likelihood of an increase in tire schedules in the Dominion until Dec. 1 or later, according to the statements of Canadian tire producers. This is quite in keeping with past tendencies in the Canadian market and the declaration is made that Canadian prices have not been increased at all in the same proportion to United States quotations. The net increase in the price of tires in the Dominion since the outbreak of the war has been only 30 per cent. Four advances have been made in the United States, totalling 35 to 40 per cent since the first of the present year. The last Canadian increase took place on April 27, when prices went up a 10 per cent average. With the recent advance in the United States, there is a difference of only some 20 per cent between present Canadian and American prices, with the Canadian-made tires costing the one-fifth more, of course. Duty on tires coming into Canada from the United States amounts to 35 per cent with a war tax of 7½ per cent—really making the tariff on imports 42½ per cent. Canadian manufacturers, therefore, do not take full advantage of the duty protection, it is pointed out.

Changes in tire prices in Canada since the start of hostilities in August, 1914, have been as follows: Feb. 15, 1915, 10 per cent increase; Oct. 15, 1915, 10 per cent decrease; Jan. 19, 1916, 10 per cent increase; Dec. 18, 1916, 10 per cent increase; April 27, 1917, 10 per cent increase. Net increase in more than 3 years is 30 per cent.

C. H. Carlisle, of Toronto, general manager of the Goodyear Tire and Rubber Co., of Canada, Limited, supplies the following comparisons in Canadian prices of raw materials: On April 1, 1915, price of Sea Island cotton was 48 cents per lb. This cotton is practically unobtainable now, he says, but it is now quoted at $1.60 per lb. in Canada. Normally rubber sold from 48 cents to 50 cents per lb. To-day crude rubber costs 74 cents per lb. Prices of compound materials have advanced from 75 to 110 per cent since the beginning of the war in 1914. Another item affecting the market value of tires has been the cost of coal. In 1914, the Goodyear company paid only 65 cents per ton for slack, while the contract price at the present time is $3.75 per ton at the mine. There is a 5 per cent tax on crude rubber from England when it comes in direct shipment and 7½ per cent tax if it comes from a non-British source. Rubber enters the United States duty free. In addition, cotton carries a duty of 27½ per cent as an import in the Dominion, while the duty on machinery into Canada is 35 per cent. In spite of these taxes on imports of raw materials and the protective tariff on imported tires, Canadian tire prices are only 20 per cent, in round numbers, higher than present quotations in the United States.

New Commerce Tractor Unit

DETROIT, Oct. 9—A complete 3-ton semi-trailer and tractor unit, selling at $2,090, has just been brought out by the Commerce Motor Car Co., Detroit. The outfit consists of a model E, 1-ton Commerce chassis and a King Trailer Co.'s two-wheeled semi-trailer with a King-Irwin fifth wheel. The semi-trailer wheels are fitted with 34 x 5 solid rubber tires. The load space is 5 ft. 6 by 14 ft. This unit is all ready for immediate delivery.

First Class B Army Trucks Completed

(*Continued from page 642*)

the engineers who worked on the job at the request of the Quartermaster and as members of the Society of Automotive Engineers are convinced that it is right is evinced by the fact that already orders for 10,000 parts for the truck have been placed, these orders including engines, axles and other parts. These orders have been widely placed over the industry, generally three or more different concerns receiving orders for each of the different parts. As soon as plans mature it is expected that orders for many additional trucks will be placed.

The criticisms as to the truck being too heavy for its carrying capacity have been largely dissipated by official weight given out by those concerns building the units entering into the first machines. The truck maker who assembled the first truck states that the total weight of the chassis without body is 8600 lb., which, with a 1600-lb. body, will bring the total up to 10,000 lbs. This is very little heavier than some of the best 5-ton trucks now on the market. Considerable paring will be done on this weight, as there are several places where weight can be reduced with comparative ease.

A few examples of weights as given out by makers that have produced some of the parts gives an indication of how well the engineers have done their job notwithstanding that they were under orders to build a stout robust job suited to the extreme service of the war zone.

With different makers these weights vary from 40 to 50 lb. in the cases of the motor, and there are smaller variations with other parts. Without doubt weights of these parts taken after they are well in production will show many cuts in all of these figures.

	Lbs.
Body	1600
Motor	1012
Rear axle	1592
Front axle	352
Gearbox	233
Clutch and case	103
Frame without castings	653
Front springs	148
Rear springs	544

Roughly there were four major divisions of the engineering job, (1) the engine, (2) the transmission, (3) the axles and (4) the chassis parts. Each was executed by a corps of engineers. There were three, four and in some cases five different companies represented in the work on one unit and it was necessary for them to get together and produce the best.

The speed with which the different makers tackled their respective jobs and completed them is shown by the following:

Continental, which was one of the several engine concerns to work on the engine, got its blue prints on October 9 and the engine was running in 19 days and 18 hours.

Waukesha made a still better record, getting its first engine running in 11 days 7½ hours from the time the blue prints reached its factory. These companies did not have to make the patterns for castings or the dies for forgings, these having been previously made, but they had to do all the machining and other operations on the parts.

In developing the engines, four or five engine makers co-operated by dividing the different parts among them, one concern making several parts not only for itself but for the other engine makers. In this way time was economized.

Thus, Continental made the cylinders, gear case cover and many small parts such as pumps, bushings, etc. Waukesha manufactured the cylinder heads, the crankcase, intake and exhaust manifolds, roller push rods, etc. Wisconsin made the lower part of the crankcase. In this way the work was farmed out.

In summarizing the co-operating talent embodied in the engine, it might be said that the crankcase is Continental, the cylinders Waukesha, the oiling system Wisconsin, the pistons Hercules and the timing gear system a combination of Buda, Wisconsin and Continental. The governor is a combination of Kelly-Springfield and Waukesha. The camshaft is a composite design.

The engine has been designed with the thought in mind of the use of heavier fuels, including kerosene, and is such that heavier fuels will only call for an extension of the manifold system, the combustion chambers and many other parts having been designed to meet the requirements of heavier fuels.

What has been said of the engine can be said of the transmission, the axles, and many chassis parts. Three or four of the leading axle makers have worked together on the axle designs. So with the transmissions.

Hodgkins Returns to Studebaker After Serving in Navy

SOUTH BEND, IND., Oct. 8—R. T. Hodgkins, general sales manager of the Studebaker Corp., has just returned to assume his duties following an absence of 3 months during which time Mr. Hodgkins served as a lieutenant in the navy. He was released from war duty because of the importance of his commercial duties.

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Hi Sibley, who has been special representative for THE AUTOMOBILE AND AUTOMOTIVE INDUSTRIES in Europe, on the Mexican border and in Japan, is now publicity manager for the Republic Motor Truck Co., Alma, Mich. The initial issue of *The Republic Radio* marks his appointment. Human interest such as Mr. Sibley has incorporated in his various articles in this publication appear in the *Radio*, terms of subscription to which are given as "Your Good Will."

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James F. Bourquin, vice-president of the Liberty Motor Car Co., Detroit, has been summoned to Washington to assist in the production of army trucks.

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Wallace C. Hood, president of the Hood Service Bureau, who, as was recently announced in AUTOMOTIVE INDUSTRIES, has become sales manager of the King Motor Car Co. will continue as president of the Service Bureau and will retain his stock, but will leave the managership to Frank M. Eldrege, the secretary and treasurer who has been appointed general manager of the Bureau.

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G. Arnold Dimond, president of the Singer Motor Co., Long Island City, and E. Bailey Libbey, secretary and treasurer of the company, have joined the colors and are lieutenants in the Twenty-seventh division at Spartanburg. This leaves the task of conducting the factory to J. Renwick Dimond, who will relinquish his sales agency for the car in New York to another dealer in the near future. Phillip Schwangle succeeds Libbey.

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J. W. Applin, assistant to D. McCall White, chief engineer of the Cadillac Motor Car Co., has been promoted to chassis engineer, succeeding L. K. Snell, who recently resigned.

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L. E. Gibson, representing the Hupp Motor Car Corp., will make a trip through South Africa and Spain, leaving this country in the near future.

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H. J. Vogler has resigned as New York wholesale manager of Willys-Overland, Inc., to accept a commission as captain in the ordnance section of the United States Army. Captain Vogler has been in the automobile industry for 10 years.

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H. C. Biggam, who was formerly with the Marmon company of Indianapolis, has become sales manager of the Western Motor Car Co., Cincinnati.

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C. L. Myers has been appointed division manager of the Prest-O-Lite Co., Indianapolis, in the Milwaukee territory, succeeding C. F. Mitchell, who has been transferred to Memphis, Tenn.

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R. H. Southerland, formerly foreign representative of the Splitdorf branch in London, has become manager of all the Splitdorf branches, with headquarters in New York.

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W. P. Berrien, vice-president and sales manager of the Batavia Rubber Co., has resigned. He was at one time connected with Firestone, Packard, Standard Automobile and other companies.

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P. H. Fonda has joined the United Motors Service, Inc., representatives of the Delco, Klaxon and Remy companies, as office manager, with headquarters in Detroit. Mr. Fonda was formerly with the Dayton Engineering Laboratories Co.

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Lieutenant H. G. Shockey, president of the Denby Detroit Sales Co., Detroit, has been ordered to report for duty in command of a motor truck company at Camp Custer.

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R. W. Fontaine, formerly special foreign representative of the Willys-Overland Co., Toledo, has resigned from the Cuban Auto Importing Co., Havana, selling Stutz and Cole cars, to take charge of the sales department of the Havana Auto Co., representing Renault, Pierce-Arrow, Mercer, Premier, Hupmobile and Anderson.

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Walter A. Almy has been made manager of the carriage sales department of the Packard Motor Car Co. of Philadelphia.

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Albert R. Chappell, president of the Imperial Oil Co., St. Louis, has been called to the Scott Aviation Field, near that city, to conduct a series of tests of oils for the army airplanes being used there.

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Webster Colburn, second vice-president of the Dorris Motor Car Co., St. Louis, has severed his connection with that company to take up a new venture which he is not yet ready to identify.

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R. C. Frampton, former field manager of the sales department for the Hudson factory, has been named general manager for the Hudson-Phillips Motor Car Co. of St. Louis, a factory property.

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W. R. Rose has resigned as retail sales manager of the Albany, N. Y., branch of the Willys-Overland Co.

Men of the Industry

Changes in Personnel and Position

Rohde Is Service Director of Wire Wheel Corp.

NEW YORK, Oct. 8—O. J. Rohde, formerly president and general manager of the Splitdorf electrical branch in New York, has resigned to become director of service of the Wire Wheel Corp. of America. This corporation will establish service stations in all the large cities of the United States.

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J. A. Ryan, a factory man, has taken charge of the Michelin Tire Co. branch in St. Louis, succeeding Fred Morey, transferred to the factory.

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Arthur M. Goodfellow has been appointed Western sales manager of the Nice Ball Bearing Co., Philadelphia. He was formerly associated with the Standard Roller Bearing Co.

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B. J. Welzman has resigned as advertising manager of the Standard Motor Truck Co.

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George Pearson, Jr., has been appointed supervisor of the retail sales of the Maxwell Motor Co. He will handle trucks particularly.

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Harry B. Kinsel is resigning from the Motor Products Corp. to join J. P. Ryerson & Son, Chicago.

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L. T. Parker, of Cincinnati, has joined the sales force of the United States Motor Truck Co., Cincinnati.

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P. C. Keenan, formerly assistant general sales manager of the Winchester Repeating Arms Co., has been appointed manager of the Chicago branch of the Pennsylvania Rubber Co.

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A. Thomas Schooley has become district manager for the Commerce Motor Car Co. and will have charge of Texas, Oklahoma, Kansas and western Missouri.

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Pierce G. Smith, formerly assistant sales manager of the American Malleables Co., Detroit, has been appointed general sales manager of the company and will be located in the future at the main offices of the plant at Lancaster, N. Y.

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Frederick S. Lawrie, sales agent, 910 Merchants Bank Building, Indianapolis, handling factory accounts on special automotive material, has been commissioned a captain in the Ordnance Section, Officers Reserve Corps of the United States Army, and will leave for active service as soon as assigned. During Mr. Lawrie's absence his associate, Mr. Jas. F. Lindley, will carry on the business as heretofore.

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W. C. Roth, purchasing agent of the Detroit Lubricator Co., has resigned his position and joined the United States army. He will purchase supplies for the signal corps.

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L. C. Van Beaver has joined the Saxon Motor Car Corp. and will work as special

assistant to H. W. Ford, president. Mr. Van Beaver was formerly the head of the Willys-Overland Co. of England, which position he recently resigned.

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J. E. Hannon, formerly secretary of the Michigan State Fair, is now assistant general manager of the Clyde Car Co., Clyde, Ohio.

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Alfred D. Kelly has been appointed assistant general manager of the Parker Rust Proof Co. He was formerly a special Chalmers representative.

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R. J. McElwee, purchasing agent for the Detroit Specialties Co. has resigned to join the General Motors Co., Pontiac. He is succeeded by J. H. Burnie.

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J. P. Winterson has resigned as zone manager of the Chalmers Motor Co. in the central southwest to join the sales forces of the Elgin Motor Car Corp.

B. J. MacMullen has resigned as general manager of the Hudson-Phillipps Motor Car Co. of St. Louis to become manager of the Chevrolet factory in Fort Worth, Texas.

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R. P. Bishop has resigned as sales manager of the King Motor Car Co. to become assistant sales manager of the Nash Motors Co., Racine, Wis. Mr. Bishop is succeeded by W. C. Hood.

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Corbin Returns from Russia

DETROIT, Oct. 5—Arthur E. Corbin, of the Russian Automotive Engineering Co., and who was formerly assistant sales manager of the Packard Motor Car Co., reached Detroit from Petrograd recently and will make a stay of several weeks. The Russian company with which Mr. Corbin is associated handles Pierce-Arrow, Hupmobile and Hudson cars and Hurlburt and Federal trucks. Mr. Corbin states that all business at the present time is with the Government and that transportation is at a standstill. The company has 135 cars at the port of New York, where they are awaiting for the past 14 months for shipment.

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New Stewart-Warner Bumper

CHICAGO, Oct. 8—The Stewart-Warner Speedometer Corp. has brought out the Stewart Autoguard, a bumper designed for Fords. It is furnished with special brackets which make it possible for quick installation. There is no cutting of metal or drilling necessary. The channel bar, or the guard, is made of high carbon steel; the spring members are made of high carbon spring steel. A license plate bracket is included with this model. The shock absorbing members consist of two full elliptic springs, extending over toward the ends of the bar. The price is $7.50. West of the Rocky Mountains it is $8.25.

Calendar

ASSOCIATIONS

Oct. 9-11—Pittsburgh National Assn. of Purchasing Agts. Convention.
Oct. 9-11—Chicago, National Federation of Implement and Vehicle Dealers' Assn., 18th Annual Convention. Hotel Sherman.

1918

Jan. 3-4—New York, Automotive Electric Assn., meeting.

CONTESTS

Oct. 6—Danbury, Conn., Track Race.
Oct. 6—Uniontown, Pa., Speedway Race.
Oct. 11-12-13—Chicago, Master Driver contest.
Oct. 13—Richmond, Va., Track Race.
Oct. 13—Chicago Speedway Race.
Oct. 27—New York Speedway Race.
Oct. 24—Columbus, Ohio, Dixie Highway tour.

SHOWS

Oct. 1-6—Buffalo, N. Y., Closed Car Show, Automobile Dealers' Assn., Elmwood Music Hall.
Oct. 1-13—Wichita, Kan., Show.
Oct. 6-13—Boston, Closed Car Show, Boston Automobile Dealers' Assn.
Oct. 6-13—Cincinnati Automobile Show, Music Hall, Cincinnati Automobile Dealers' Assn.
Oct. 10-17—New York, Electrical Exposition, Grand Central Palace.
Oct. 13-20—Atlanta, Ga., Atlanta Automobile Association. J. W. Ranshaw, Mgr.
Oct. 13-28—Dallas, Tex., Dallas Automobile & Accessory Dealers' Assn., State Fair.
Oct. 22-27—Worcester, Mass., Casino & Bankcroft Hotel. E. H. Winchell, Publicity Mgr.
Nov. 12-17—Los Angeles, Cal., Motor Car Dealers Assn. Billy Sunday Tabernacle.
Nov. 12-18—Denver, Col., Automobile Trades Assn., Show Committee, Auditorium. G. A. Wahlgreen, Mgr.

1918

January — Kalamazoo, Mich., Kalamazoo Automobile Dealers' Assn., Armory.
Jan. 5-12—New York Show, Grand Central Palace, National Automobile Chamber of Commerce.
Jan. 11-19—Providence, R. I., R. I. Licensed Auto. Dealers' Assn., State Armory. Percival S. Clark, Mgr.
Jan. 19-26—New York, Motor Boat Show, Grand Central Palace, National Assn. of Engine and Boat Manufacturers.
Jan. 19-26—Montreal, Show, National Motor Show of Eastern Canada, Montreal Automobile Trade Assn.
Jan. 21-26—Manchester, N. H., Academy. Couture Bros.
Jan. 21-26 — Scranton, Pa., Scranton Motor Trades Assn., Armory. Hugh B. Andrews, Mgr.
Jan. 19-28—Montreal, Can., Montreal Automobile Trade Assn., Ltd., Almya Bldg., T. C. Kirby, Mgr.
Jan. 23-28—Allentown, Pa., Lehigh Auto. Trade Assn., Traylor Motor Co.'s. Garage. P. W. Leisering, Publicity Mgr.
Jan. 26-Feb. 2—Chicago National Show, Coliseum and Armory, National Automobile Chamber of Commerce.
Feb. 11-16—St. Louis, Mo., St. Louis Auto Mfrs & Dealers' Assn., Robert E. Lee, Mgr.
Feb. 18-23—Newark, N. J., N. J. Auto Exhibition, Co. G First Regiment Armory Claude E. Holgate, Mgr
Feb. 18-23—Des Moines, Ia., Des Moines Automobile Dealers' Assn., Coliseum. C G. Van Vliet & Dean Schooler, Mgrs.
Feb. 18-23—Springfield, Ohio Springfield Auto Trades Assn., Memorial Hall. C S. Burke, Mgr.
Feb. 18-25 — Pittsfield, Mass State Guard, State Armory. James J. Callaghan, Mgr.
Feb. 18-27—So. Bethlehem, Pa., Fourth Annual, (cars 18-23; trucks 25-27), Coliseum. J. L. Elliott, Mgr.
March—San Francisco, Cal., Motor Truck Dealers of San Francisco, Auditorium. Ivan R. Gates.
Mar. 19-24—Cedar Rapids, Ia., Cedar Rapids Auto Trade Assn, Auditorium.
Apr. 9-13—Stockton, Cal., San Joaquin Auto Trade Assn. Samuel S. Cohn Mgr.
Sept. 23-28—Chicago, National Accessory Show for Fords, Coliseum.

Engineering

American Railway Master Mechanics' Assn.
American Institute of Electrical Engineers.
Master Builders' Assn.
American Society of Heating and Ventilating Engineers
Association Iron and Steel Electrical Engineers.
Mining and Metallurgical Society of America.
Society of Automotive Engineers.
Illuminating Engineering Society.
National Electric Light Assn.
National Gas Engine Assn.
American Society for Testing Materials.
American Institute of Metals.
American Foundrymen's Assn.
Society Naval Architecture and Marine Engineers.

OCTOBER

11—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penn. section at Phila.
13—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
15—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.
17-18-19—Amer. Gas. Inst. at Washington, D. C.
18—Mining & Met. Soc. Amer. monthly meeting New York section Engrs. Club.
20—Assn. Iron & Steel Elec Engrs. monthly meeting Pittsburgh section.

NOVEMBER

3—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
8—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penn. section at Phila.
9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
10—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
12—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
12—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
15—Mining & Met. Soc. Amer. section at Engrs. Club.
15-16—Soc. Naval Arch. & Marine Engrs. annual meeting.
17—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.
19—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.

DECEMBER

1—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
8—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting monthly meeting New York Ill. section at Chicago.
11—Amer. Soc. Heat. & Vent Engrs. monthly meeting Mich. section at Detroit.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penn. section at Phila.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
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